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FRONTISPIECE

PORTRAIT STUDY

JOHN H. GARO

Chem 47938

Complete Self-Instructing Library of Practical Photography

VOLUME X

Negative Retouching, Etching and Modeling. Encyclopedic Index. Glossary.

J. B. SCHRIEVER
Editor-in-Chief

Popular Edition

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CHAPTER I.

Negative Retouching.

Introduction.

1. **The Object of Negative Retouching.**—In delivering finished work to your customers, you do not hand them the photographic negatives, but the prints made from these negatives.

2. In the early days of photography, when the so-called "wet-plate process" was in use, prints were made direct from the negative without any alteration whatever, as the wet-plate rendered softer effects than are obtainable with the ready prepared dry-plate. The imperfections were less visible, and at that time the general public were satisfied with an exact likeness of themselves. With the advent of the dry-plate, however, the defects in the human face became more apparent on the negative, and there arose a demand for a greater softening of the lines and a removal of the more objectionable imperfections. At first, these imperfections or blemishes were removed, by means of a brush and color, from each individual print. So numerous, however, were these imperfections, and so irksome became the labor of eliminating them from the print, that the photographer was compelled to devise some means whereby he could apply these remedies direct to his negative so that each print made from the negative would have these blemishes eliminated. The results of these endeavors led to retouching the negative.

3. From the above we see that the object of negative retouching is to remove all the imperfections from the negatives, placing them in such a condition for printing that the

resulting prints will all be uniform, and no extra work will be required upon them after they are finished and mounted.

4. When photographers first began retouching it was done with brush and India ink, but they finally adopted the use of metallic lead, first grinding the surface of the film of the negative with pumice stone, in order to produce a "tooth," and then, by means of metallic lead, penciling over the objectionable portions. Later on, when the prepared papers came into use, it was found that the ground surface of the film was objectionable, as the grain reproduced in the print. After considerable experimenting a solution was adopted and applied to the negative, giving sufficient "tooth" to enable the use of an ordinary lead pencil for removing the blemishes. This solution is known today as retouching varnish, or "dope."

5. Probably one of the first solutions of the kind placed upon the market was Jewell's Retouching Medium, and today there are many mediums prepared after similar formula, all of which are good for the purpose.

6. **Negative Retouching.**—The photographic negative, whether portrait or landscape, is seldom ready for printing immediately after it is dry. A certain amount of hand-work on it is necessary, and the process of correcting existing defects and building onto, or taking from, various parts is termed retouching and etching, respectively.

7. By retouching is meant the removal of all spots, blemishes and imperfections in the negative, as well as the *building* up of shadows, hollows, etc., that are visible; also the modeling of the features in a portrait, and the accentuating and strengthening of details in landscapes, architectural and commercial negatives. To accomplish this, we must apply some substance that will blend perfectly with the color of the plate. Some plates being more dense than others require a heavier or lighter application of this material. The negative being of a slate-brown color, the nearest approach to matching this tone is with the lead color; therefore, a lead pencil is employed for retouching.

It is not only very convenient to handle, but also very easily applied.

8. **Etching.**—Etching is exactly the reverse of retouching, for by means of the etching knife, which is a very sharp steel blade, the film is shaved or scraped in proportion to the amount required to be removed; thus high-lights are reduced, shadows accentuated, objectionable portions removed, and detail produced where the opacity of the negative was so strong as to destroy it.

9. **Object of Retouching.**—We have seen that the object of retouching and etching is to remove spots, blemishes and imperfections, and to model the portrait negative or perfect the landscape negative. The lens often sees more than the human eye. It may magnify imperfections which are unobserved on the natural object or subject. The ordinary plate does not reproduce the tonal values of the object, yet it is used for most all purposes, with the result that light blues reproduce white, yellow reproduces very dark, ruddy cheeks appear hollow, etc.

10. Many times the operator fails to correctly light the subject, and the false lights which will then exist must be removed and correct lights built up. The negative may be under or over-exposed, under or over-developed. There are times, also, when it is necessary to alter the expression—to remove a scowl, or to close an open mouth with teeth showing. The drapery may have to be changed and imperfections removed which the operator has failed to overcome. It is for these and many more reasons that retouching is necessary. The photographer, in making the negative, should aim to reproduce in the portrait the very best qualities of the individual, subduing the more undesirable features. If he has failed in this, his retoucher must do what he can to correct the oversight or deficiency.

11. Although few workers agree as to the exact amount of retouching required, all acknowledge that a certain amount is absolutely essential in order that the negative may be in perfect condition for printing. A certain class of workers contend that there should be little

more than enough lead applied to the plate to remove the most apparent predominating blotches and spots. Then, there are those who go to the other extreme and literally cover the negative solid with lead, retouching without any regard whatsoever for the modeling, or without even attempting to retain the likeness of the individual. It is their aim to idealize the subject. While this is permissible and can be accomplished by the judicious application of the lead and etcher, yet by over-retouching all character and expression of the face is lost. Judgment must, therefore, be exercised just as much in retouching as in any of the other branches of photography and a mean between these two extremes aimed at.

12. It is not only necessary to remove the transparent and more striking imperfections, but the entire face should be blended and modeled so that no harsh lines exist. Aim to secure a thin negative which will produce a print with excellent gradations between high-lights and shadows; a print that will retain all of the character and likeness of the individual. The general public demands considerable work on the portrait negative, but the retoucher must use careful judgment and not go so far with the pencil work as to destroy all likeness and flatten out and destroy the modeling.

13. **Classified Subjects.**—The subject has everything to do with the amount of work applied to the negative. For example, negatives of aged persons, whether man or woman, require less lines to be removed than younger people, and negatives of men require less retouching than those of women, regardless of age. Children with plump, solid faces usually have few imperfections to correct, yet their little faces should be modeled and rounded. Thus, it will be seen that judgment must be exercised in the application of the work, being guided entirely by the subject you are working on. It is true that in some instances customers require all lines removed regardless of their characteristic bearing. In many cases these same customers will be well pleased if their lines are modified, yet

retained to a certain degree. Wherever possible, one should strive to retain as much of the characteristics of the subject as possible.

14. **Learning Retouching.**—It is by no means a difficult matter to learn the art of retouching, for all who will study and apply the fundamental principles should be able to improve their negatives. Perfection in negative retouching, however, will come only by continual practice. The reason beginners fail at times to secure satisfactory results in their first attempts, is due to the fact that they become anxious to see their final results too quickly and thus apply too much lead in an unsystematic manner and in places where it is not needed. It is only by a slow and intelligent manner of procedure that you will master each and every principle. It is absolutely essential to understand the elementary principles of the work before you can expect to produce the best of results and gain speed in operation, which latter comes only by practice.

CHAPTER II.

Preparatory Instruction.

15. The pencil is the agent employed, in retouching, to remove transparent or semi-transparent imperfections and blend the high-lights and shadows as well as the half-tones. The pencil employed must not be gritty, nor should it be soft or mushy. For the beginner, it is advisable to use a reasonably hard lead, such as a Faber's HHH or any drawing pencil of equal hardness. After some experience, and when you begin to master the touch required and are able to control the application of the lead, it will be advisable to change to an HH lead. This latter will be found very suitable for the majority of workers.

16. **The Materials Required.**—The absolutely necessary articles required for retouching are few, but no work should be attempted without them. The following outfit will be required to prepare the work of this instruction:

17. **Retouching Outfit.—**

1 Retouching Easel.
1 Magnifying Glass.
1 Lead Holder.
1 HHH lead.
1 HH lead.
1 BB lead.
1 Etching Knife.
1 No. 1 Faber's Spotting Brush.
1 Cake Spotting Opaque.
1 Bottle Retouching Fluid.
1 Bottle Negative Varnish.
1 Box Schriever Etching Paste.
1 5 x 7 Printing Frame.

1 Package Proof Paper.
12 Practice Plates of Bust Portrait Negatives.

18. **Object of Retouching Desk.**—The retouching desk or frame is necessary for holding the negative so that it may be held conveniently and permit of strong light being reflected through it, thereby exposing the imperfections and making it possible to see and easily remove them. The negative must be properly supported in this frame so as not to require holding in position. Both hands can then be free, thus enabling you to view the work you are doing from any point, thereby concentrating your attention upon the removal of the imperfections and modeling to the desired degree.

19. **Preparing the Negative.**—With the easel provided, the next step is the preparing of the negative. The surface of the film of the negative (the side which is to be worked upon) is usually so very hard and smooth that the pencil touches will not adhere. For this reason it is necessary that the negative be properly prepared to receive the pencil strokes.

20. **Retouching Medium.**—There are two kinds of retouching medium, either of which can be purchased from any photographic supply dealer, or you can prepare it yourself. One medium is called *retouching dope* while the other is *retouching varnish.* The former is quite thick and gummy and is applied to the negative by means of a tuft of cotton, or a Canton flannel cloth. The entire negative is not prepared; only the space covering those portions you wish to retouch is doped. After applying, the dope must then be rubbed in a circular motion until nearly dry.

21. The retouching varnish is very thin and is, therefore, applied by flowing the entire plate. Do not confuse these two mediums.

22. To prepare retouching dope yourself, proceed according to the following formula:

Retouching Dope.

Balsam of Fir .....1 oz.
Turpentine .....1 oz.

23. This is a very simple preparation and supplies a most excellent retouching medium and for the beginner gives the best of satisfaction. If, after applying the medium to the negative, it does not take the lead freely, add from ⅛ to ½ oz. of ordinary resin to the medium—the amount of resin depending upon the amount of tooth you desire. Be sure to keep the bottle, in which the dope is prepared, well stoppered, for the turpentine easily evaporates, leaving a thick mass in the bottle, which, if applied to the negative, in this condition, will give you a very tacky surface to work upon and will not produce smooth results.

24. Another retouching dope which works satisfactorily, is prepared by mixing:

Turpentine	1 oz.
Oil of Lavender	15 drops
Gum Dammar	½ drm.

25. **Applying the Retouching Dope to the Negative.**—The plate must be perfectly dry before applying any medium. In applying the dope to the negative the smallest quantity must be used, for if too much is employed it it will require a longer time for it to dry and the over-charge of dope may show in the print. A drop or two applied to the space you want to retouch, or just enough to give a tooth, is all that is necessary.

26. A simple way to apply the dope would be to prepare your medium in a two ounce, wide mouthed bottle, having a cork stopper. In the under side of the cork insert a wooden toothpick. By placing the cork stopper into the bottle, the toothpick is always immersed in the dope, and when you want to prepare a negative all that is required is to withdraw the stopper and touch the point of the toothpick to the surface of the film. Each touch will leave a drop of the dope, and from 1 to 3 drops is sufficient for a space 3 inches in diameter.

27. After dropping on the dope, return the cork to the bottle and spread the solution with a small tuft of absorbent cotton (or Canton flannel cloth), lightly rubbing the parts to be retouched in a circular motion until the

dope begins to feel tacky, at which time rub a little harder until the surface becomes smooth. Should the dope evaporate at any time and become so thick and sticky that it is difficult to use and spread on the negative, the addition of pure turpentine will bring it back to its normal condition. As the fluid dries quickly when applied to the negative, you may have to try several times in order to secure the desired result. In case it does dry before you get it rubbed, slowly add a little more fluid and repeat the operation.

28. The surface, when properly prepared, must not appear sticky nor tacky, but slightly glossy. If it is tacky, or, in other words, too thick, too much of the fluid has been left on the plate and the lead will take too readily. If too little of the fluid is left on the plate, you will not have sufficient tooth and the pencil will hardly make a mark. After a little practice you will be able to prepare the plate properly.

29. **Retouching Varnish.**—Where the retouching varnish is employed in place of the dope, Hammer's Retouching Varnish will be found by far the most satisfactory medium to employ. The following formula is an excellent one for preparing a similar varnish:

Gum Mastic .....23 grs.
Ether .....1 oz.

The ether cuts the gum and the latter must be thoroughly dissolved.

30. A mortar and pestle will be very serviceable in preparing this medium. After the gum is thoroughly dissolved it is poured very slowly (drop by drop) into 6 ounces of gasoline. *Do not* stir the gasoline while adding the gum, but allow the gum solution to mix with the gasoline itself. By adding the gum slowly drop by drop, the gasoline will take care of the gum and properly dissolve it. After the gum solution is added, set in a cool place, undisturbed for at least 12 hours before using. Under no circumstances should this preparation be removed or disturbed until sufficiently seasoned, ready for use.

31. **Varnish Caution.**—As gasoline will very easily ig-

nite, it must never be handled near fire or lights of any kind.

32. **Applying the Varnish to the Negative.**—The varnish is applied by holding the negative perfectly level in one hand. With the plate resting on the tips of three fingers and between the ends of the little finger and thumb, pour a sufficient quantity of the varnish on the upper right-hand corner, so that when the negative is slightly tilted the varnish will flow evenly over all portions. By tilting the plate first slightly to the left, you will cover the upper portion evenly; then slightly raise the upper end, so the varnish will descend and flow evenly towards the bottom of the plate. In this way you will obtain an uniform flow of the varnish and produce an even surface. Never tilt the plate back after the varnish has been flowing in one direction—to do so will give you ripples and lines in the varnish. The surplus varnish flowing from the plate may be drained back into the bottle. A large-mouthed bottle should be used for the retouching dope and a small-mouthed bottle for the retouching varnish. Keep both tightly corked.

33. **Removing the Retouching.**—When it is desired to remove the retouching, which is frequently the case—especially with your first experiments where too much lead is applied to produce the desired results, or where the dope applied does not give sufficient tooth, or where, for any reason, you want to work the plate over again and the work applied is to be removed—do so by applying the solvent of any medium you are using. If you are using retouching dope, then drop a few drops of turpentine on the negative and with a tuft of cotton rub over the surface, which will instantly remove all retouching, as well as the dope.

34. The *retouching dope* may be substituted for the *turpentine* to erase work done, if so desired. When using the dope for erasing the lead, you also prepare the plate again for retouching. When the turpentine is used for erasing the work done, the surface must be rubbed perfectly dry before again applying the dope.

35. When *retouching varnish* is used as the retouching medium, the solvent employed in making the varnish may be used for removing the varnish and retouching from the negative. The solvent used in the formula given herein

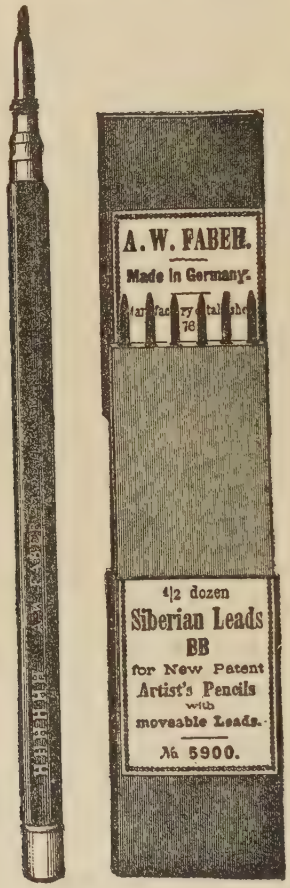

Illustration No. 1
Faber Pencil Holder and Leads
See Paragraph 36

for retouching varnish, being gasoline, pure gasoline should be used when it is desired to remove any work where this medium is employed. Where gasoline cannot be had, wood

alcohol may be employed successfully by applying a few drops to the plate and rubbing dry with a tuft of cotton.

36. **Pencils.**—The principal pencils in use are those made by the A. W. Faber Co., and while pencils suitable for retouching are made protected by cedar wood, similar to the ordinary pencil, yet the loose leads made for the adjustable holders are employed almost exclusively for retouching, as the latter are by far more economical and convenient to use. (See Illustration No. 1). One holder will be all that is necessary, no matter how many different leads you desire to use. The leads are made in various degrees of hardness, costing 50 cents for a box of six leads.

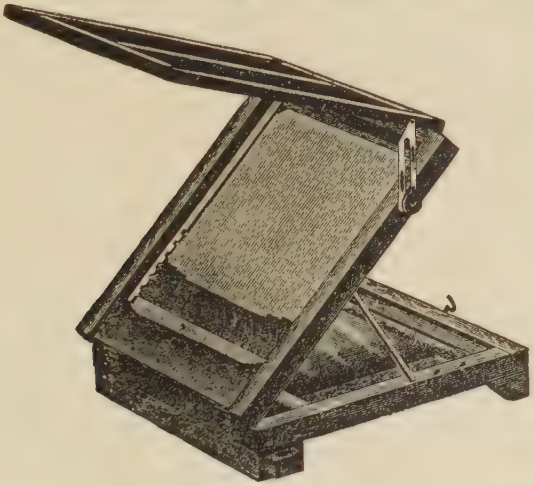

Illustration No. 2
Retouching Desk
See Paragraph 38

37. The most useful leads, as previously stated, are the HH and HHH. Once in a great while it will be desirable to use a BB lead, which is quite soft, and will be serviceable when building up very transparent shadows, or removing extremely heavy imperfections, spotting negatives, etc. The pencil should be sharpened at a far more tapering point than is generally used in the average writing. The point of the lead should be at least ½ inch from the

commencement of the taper, and should be smooth and even.

38. **Retouching Desk.**—A suitable retouching desk may be obtained from regular dealers in photographic supplies. In Illustration No. 2 is shown a very convenient easel which will close up in very compact form. For those who prefer making their own outfit, the following description may be of assistance:

39. A retouching desk or easel should be made as convenient and yet as compact as possible. First, provide three pieces of soft wood surfaced on both sides, ½ inch thick, 18 inches long and 14 inches wide. Cut an opening in the center of one of the boards, the opening measuring about 4 x 6 inches. Next provide two pairs of small hinges. Attach one pair under one end of the board with the hole in the center, and to this end attach the board to be used as the baseboard. At the other end or top of the easel, and on the upper side, attach the remaining pair of hinges and fasten the headboard to this end. With these three boards attached they will fold together nicely.

40. The easel may be set up so the center board will stand at an angle of about 30 degrees with the table. This may be arranged in two ways, either by attaching stationary braces or movable ones. By the former method you nail two wooden braces (one on each side of the frame) to the lower and middle sections. You also attach a pair of braces on each side of the upper and middle sections. Braces for the lower section will need to be about 14 inches in length and should be attached to the rear edge of this section, while the ones for the upper section need not be over 8 inches in length and should be attached about 7 inches from the upper end of the top and middle sections, raising the upper section to a height suitable to your convenience.

41. As the upper section serves as a hood for shielding light from overhead, this section must be made to suit the person working under it and, therefore, the length of the brace for this will depend entirely upon the user. With

the easel arranged in this manner, it will form a letter Z. Where it is desirable to make the easel adjustable to different heights and collapsible so that it may be folded up when not in use, the braces may be made detachable as follows:

42. Insert a few holes, half-way through the wood, about ¼ inch in size and one inch apart, on both sides of the middle section, on the lower side of the top section, and on the upper side of the bottom one, locating them about 6 inches from the hinge joint on the top section and about 10 inches from the hinge joint on the bottom section. Next provide four small rods of wood or metal to insert in these notches or holes, to support the frame when in use. In order to hold the negative in position in the retouching frame, insert two thumb tacks at the base of the opening in the center board. An opaque cloth thrown over this desk will keep out all light from the film side of the negative and permit retouching with ease and without any strain on the eyes. With this arrangement the desk is complete.

43. **The Reflector.**—The retouching frame should be placed on a table of normal height, close to a north window, or a window on which the sun is not shining. In order to have the light reflect evenly upon the negative, a sheet of white paper about 15 inches long may be placed directly underneath the negative on the lower section of the frame. The regular retouching easels are supplied with a mirror for the reflecting surface, but the white cardboard answers every purpose.

Illustration No. 3
Reproduction of Negative before Retouching
See Paragraph 46

Illustration No. 4
Reproduction of Negative Retouched
See Paragraph 46

Illustration No. 5
Print from Unretouched Negative
See Paragraph 47

Illustration No. 6
Print from Retouched Negative
See Paragraph 48

CHAPTER III.

Lesson I.

General Explanations.

44. **The Negative.**—Before beginning any work upon the negative, it is of utmost importance to have a thorough understanding of the method of controlling the pencil, in order to effectively apply the proper strokes to the negative. You should also understand thoroughly what imperfections are to be removed and what effect the retouching has upon the negative. You should, further, familiarize yourself with the appearance of the negative compared with the positive.

45. Beginners usually become confused when attempting to work on the negative, forgetting that the negative is just the reverse of the positive. When speaking of highlights in the negative, we have reference to the black portions or those parts which print white on paper. In speaking of shadows in the negative, we have reference to the white portions or thin parts which print black on paper. You must try to familiarize yourself with these facts. In order to more clearly demonstrate this point carefully examine Illustrations Nos. 3, 4, 5 and 6.

46. Illustration No. 3 is the exact reproduction of the negative as it appears before retouching. All of the blemishes, blotches, freckles, etc., are very much in evidence. In Illustration No. 4 is represented the same negative with all defects eliminated. It also shows how the face has been smoothed over, with the blotches filled in and built up equal to the other portions of the negative. It shows the modeling of the face with harsh lines subdued.

47. Illustration No. 5 shows a print from the nega-

tive in Illustration No. 3, before retouching. In Illustration No. 3 you will notice the spots are white. This is as they appeared in the negative, being transparent or semi-transparent. These white spots are reversed or just the opposite in the positive, for spots, freckles, pimples, etc., are usually red and reproduce black on paper, but in the negative as shown in Illustration No. 3, they are transparent and appear white. When printing from a negative with these transparent or white spots, blemishes, etc., you will observe that they become reversed, as in Illustration No. 5. The spots that are transparent in the negative (showing white in Illustration No. 3), are reversed and print black, as in Illustration No. 5, producing a very displeasing effect.

48. Illustration No. 6 shows a print from the negative shown in Illustration No. 4, completely retouched. In Illustration No. 4, which represents the negative, the black portions appear white, while the hair, eyes, mouth and shadow side of the face, are quite gray in some portions and white in other parts. In the positive, Illustration No. 6, you will see that they are reversed and these light parts are dark. Again in Illustration No. 3, the light side of the face appears very black in the negative. In Illustration No. 5, a positive from this negative, the high-lights are white and the shadows black.

49. Between these high-lights and the most dense shadows, we have what are termed intermediate tones, or, technically speaking, half-tones—tones that are less pronounced, milder, yet visible on close observation. These tones all have their value and must be preserved in their relative position to the higher lights as well as the shadows. Carefully study the illustrations above mentioned before proceeding with the actual practice work.

50. **Sharpening the Lead.**—Insert one of the leads (preferably an HHH) in the holder, leaving about one inch projecting from the end of the holder, and screw the clasp moderately tight. Sharpen the lead to a needle point with a long slant. This is best done with an emery paper hone.

PORTRAIT STUDY

STUDY No. 1 B. J. FALK

Fig. 1

Fig. 2
Illustration No. 7
Holding the Pencil and Etcher

Fig. 3

Do not use a knife for this purpose, but prepare a hone as follows:

51. Provide a piece of wood 1½ to 2 inches wide by 6 inches long, and about one inch thick. Glue a piece of emery paper of medium smooth surface to one side of the block and on the other side a piece of moderately rough emery paper. Shape the lead with the rough paper and finish off with the smooth. To sharpen the lead properly you must hold the pencil almost level with the hone. In order to grasp the pencil properly proceed as follows:

52. Place the pencil flat on the table. Grasp it about the center, between the tips of the thumb and fingers. Hold it on the hone at an angle no greater than sufficient to avoid the metal clasp of the holder rubbing on the paper. To sharpen the pencil rub it over the hone, first on the coarse side and finally on the fine emery paper. Rub lengthwise (not crosswise), using quite a long stroke, continually rotating the pencil while sharpening. To hone the lead sideways would probably result in breaking the lead. A final finish may be put on the point by rotating it on a piece of ordinary writing paper. This will remove any surplus powder of lead which would adhere to the retouching medium immediatly upon placing the point in contact with the film.

53. **Holding the Pencil.**—In Fig. No. 1, of Illustration No. 7, is shown the first method of holding the pencil. You will observe that about two inches of the pencil is extended beyond the index finger. The pencil is resting alongside the third finger, supported by the tip of the thumb, with the index finger resting on the top of the pencil.

54. In Fig. 2 we have practically the same position, only that the index finger slightly laps over the pencil. Either one of these positions is practical, and one should use that position which feels most comfortable to the hand. In Fig. 3 is shown the method of holding the etching knife for shaving and scraping, or, using its technical term, etching the negative. Instruction on the use of the etching knife will be given under Chapter XXI, Elementary Etching.

CHAPTER IV.

Lesson II.

Pencil Exercises.

55. **Control of the Pencil.**—Before attempting any work, even on the practice-prints, it will not only be necessary to understand how to hold the pencil properly, but you must also have a certain amount of training which will enable you to freely control the pencil, making light or heavy strokes as may be required. The pencil should not be held tightly, nor should your hand be doubled up in a cramped position, but hold the pencil loosely and in a position similar to that employed by expert penmen. See Figures 1 and 2 of Illustration No. 7.

56. Retouching, practically speaking, requires quite a steady hand. Beginners are apt to get nervous with their first attempt; therefore, it is advisable to practice the different movements on paper before attempting to work on a chart or negative. Observe Illustration No. 8, Figs. A and B, which represent certain movements which will be necessary in the training of the hand for the proper controlling of the pencil. Each movement should be practiced carefully.

57. Take your retouching pencil, which should have been sharpened as previously directed. Provide yourself with a few sheets of plain white paper and place them upon a table. Now, begin your practice by making circles, as in Fig. A, using the free-arm movement; *i. e.*, the hand should be held in one position and the full movement controlled solely by the muscle in the arm. Having made these circles in one direction, reverse the direction of the pencil, as in Fig. B. Continue this practice until you are able easily to make circles the same height so that the

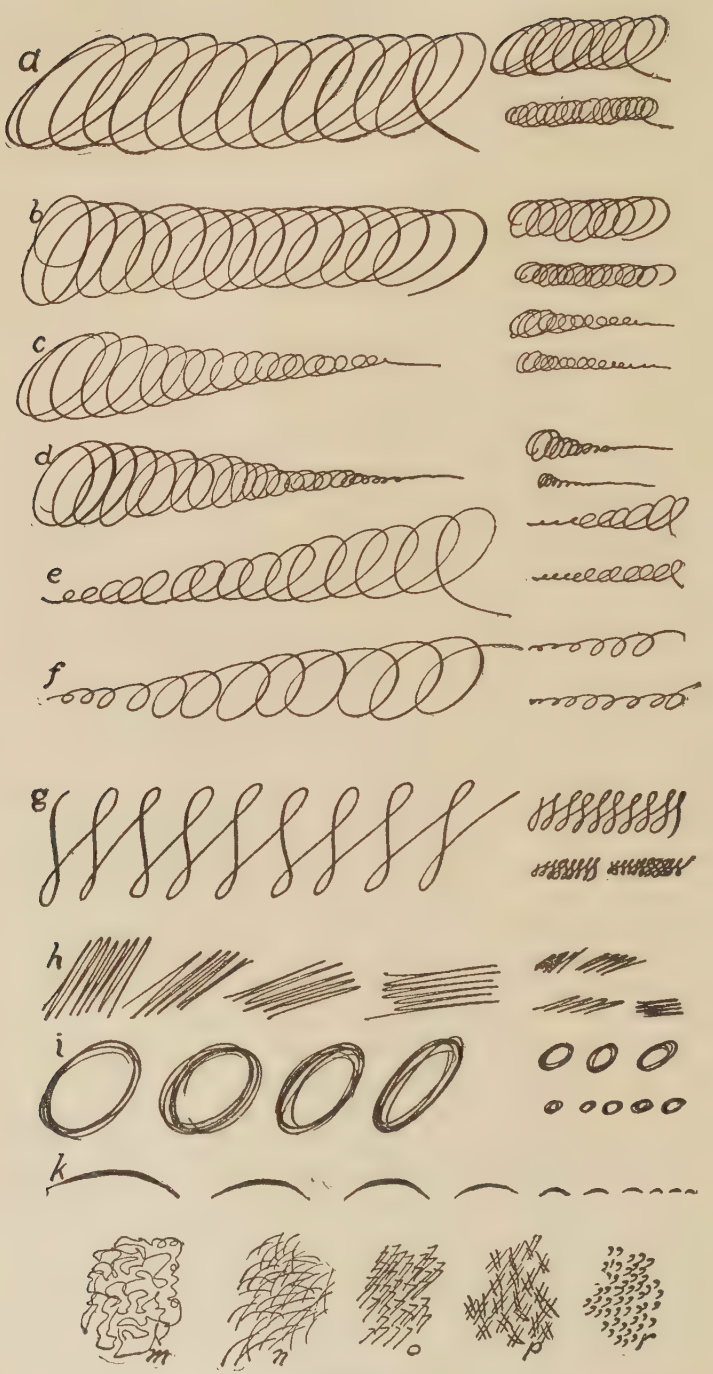

Illustration No. 8
Chart of Pencil Exercises
See Paragraph 56

edges of all circles form a perfectly straight line. This will give you excellent practice and enable you to quickly control the movement of your pencil.

58. After you are able to perform this exercise with the free-arm movement, rest the little finger on the paper and with the thumb and finger movement, go through the same exercises. This latter method will at first be found a little more difficult than free-arm movement. The circles you will make will not be as uniform in shape or height, yet exercise will tend to loosen the muscles of the fingers and give you perfect freedom of movement.

59. Following these movements, next in order take up Fig. C, the making of circles similar to the example shown, starting with the large circle and quite abruptly reducing the size of each succeeding stroke until you come down to a straight line. Follow this movement by reversing the direction of the stroke and make cones similar to those shown in Fig. D.

60. The next exercise is to begin with a straight line and work in the reverse manner, increasing the size of the circles as shown in Figs. E and F, making the strokes in both directions.

61. The next exercise will be the making of a series of figure 8s, as illustrated in Fig. G, and after having practiced this exercise, using both long and short strokes, practice making straight parallel lines at various angles, as shown in Fig. H. The lines forming each group should be of practically the same length.

62. Your next movement, Fig. I, represents a series of circles, one circle being as nearly as possible upon the other. In practicing these movements, first employ the free-arm movement, and then, resting the little finger on the paper, use the hand movement.

63. A final exercise, which should not be attempted until the others are quite well mastered, is the forming of semi-circles, permitting the pencil to bear heavier on the center of these semi-circles than on the ends, thus blending from the center to the ends. Fig. K of this illustration will

give you an idea of what is required. Practice this movement, making the strokes first to the right and then to the left.

64. Your first practice should be the making of semi-circles about an inch in diameter and then gradually decreasing the size of the semi-circle, being careful, however, that the shading remains the same, the center being heavier than either of the ends. Continue your practice of these movements until you are able to produce results similar to those supplied in the illustrations and until this is accomplished, you should not proceed with the next movement.

Practice-Prints.

NOTE.—*Enclosed in an envelope accompanying this volnme, you will find four practice prints and four transparent practice charts. Each one of these has been prepared for a specific purpose and is numbered to correspond with the instruction given in the text. Therefore, each print and chart must be prepared and used in its regular order.*

65. **Practice-Prints.**—The principal object of the preceding exercises was to limber the fingers and to train you in the control of the different pencil movements. In these exercises you were not limited to any particular space. For your next exercises we provide with this volume separate practice-prints showing the actual shape of the different blemishes. Each print represents a negative, yet it is not transparent. You will observe on these practice-prints, various blemishes such as pimples, freckles, character lines of the face, etc., which will require different strokes and varying degrees of pressure on the pencil to eliminate them. In this way you are enabled to put the previous exercises to a practical test, yet being confined to the blemishes of the actual negative on the paper. For your first work take one of the practice-prints, No. 1, which represents an enlarged portion of a face filled with freckles and large blotches. Figure 2 of this chart serves as an example of the strokes of the pencil required to eliminate these blemishes, building them up in tone to

match the surrounding surface, *i. e.*, giving the face a smooth, even texture. As the blemishes are very conspicuous, this practice-print will enable you to easily see the effect of your work and, as a whole, prove of great value for the preliminary practice.

66. The natural blemishes and defects usually to be found in a negative of the normal size is given in practice-print No. 2. Here you will observe the character lines and blemishes; indentations in the flesh, etc., which appear in practically all negatives. Your previous practice with the pencil movements should have given you fairly good control of the pencil and you should now be able to apply the lead properly to the blemishes on the the print.

67. **Removing the Blemishes on Practice-Print.**—Place one of the practice-prints, No. 1, upon the table before a north window, or under any light which will evenly illuminate the card. Properly sharpen your pencil according to previous instruction and then proceed to eliminate the freckles and blemishes of the face, beginning on the cheek underneath the eye. Remove first one blemish, building it up to match the surface surrounding it. It is not the intention to fill in the blemishes solid, but to break up the imperfections in such a way that the whole resulting effect will give looseness and flesh texture. For this reason a very fine pointed pencil, having a medium hard lead is the most desirable one to use. Bear in mind that the least number of strokes you can apply to any spot and cause the blemish to disappear, the better will be the results. To apply too much lead the surface will become glazed, while with a few strokes the blemish will be broken up and disappear; at the same time the surface will be of uniform tone. When one blemish has been removed proceed to the next one and so on until all of the freckles and imperfections have been blended and removed.

68. **The Stroke.**—Be careful to avoid working heavily on the practice-print, and again exercise care that you do not work beyond the blemish. Use any movement you see fit, following the line of the blemish at all times. It matters

not how you perform the work, so you produce the results of filling in or smoothing over. An irregular line is preferable, following the shape of the blemish to a certain extent, but steering clear of the edge of the spot or blemish. To work on the edge would intensify the outline, consequently requiring more work on the original blemish. The weight of the stroke will depend entirely upon the density of the imperfection, and upon the tint of the surrounding surfaces. Use as few strokes as possible to secure the desired result. The defects shown in this practice-print represent different shaped blemishes, wrinkles, lines, etc., and you should become familiar with them before applying any work on the regular glass negatives.

69. While we do not advise that you pay any attention to a set form of stroke, in Illustration No. 8, Figs. M, N, O, P and R, we illustrate a few general forms that are applicable to certain classes of work. In Fig. M is shown the stroke that is most generally employed by retouchers. It is actually a scribble and the pencil is seldom lifted from the plate, but the weight of the stroke is varied at the will of the retoucher, so that it will build up the imperfections to match the surrounding tints.

70. The next stroke in general use is shown in Fig. N and is a curved line. This conforms to the majority of imperfections on the face and breaks up the spots, leaving an excellent grain or texture. The main disadvantage of this stroke is that the pencil must be raised from the negative each time a stroke is made. The scribble stroke is practically the same as the curved stroke with the exception that the pencil is not lifted from the negative. In Fig. O is shown the hook stroke, which is used principally in removing the larger blemishes and imperfections. The cross-hatch, which originated in Germany, is shown in Fig. P and is very serviceable when working on extremely large spots; also when retouching backgrounds, landscape negatives, etc. The comma, Fig. R, is employed to remove freckles and small round specks or blemishes. The strokes in these five figures are enlarged at least four times, as, re-

produced in the correct size they would scarcely be visible on paper.

71. The size of all these strokes depends entirely upon the size of the imperfection that is to be removed. The weight of the stroke is governed entirely by the transparency of the imperfection as compared with the surrounding tone. When modeling the face the scribble stroke will be found most advantageous and efficient in securing the desired result in the least time.

72. There are numerous other strokes in use, but those referred to above are the simplest, and after considerable practice you will have adopted a stroke particularly your own—one which you will find to answer your purpose and enable you to secure the desired results in the least possible time and in the most efficient manner. Just remember that any stroke, no matter what shape it is, so long as it gives the results, may be employed.

73. Beginners invariably work too heavily and apply too much lead. Avoid this by applying the lead very lightly. The weight of the finger on the pencil will be sufficient without bearing on it at all. Try working with only a few strokes. Do not attempt to guide your pencil by holding it tightly, but permit it to rest loosely in the hand, even should you at first work on parts that should not be retouched. You will soon gain full control of the pencil and instinctively remove imperfections, and fully retouch the negative without having to make a special effort to guide the pencil. Stiff, heavy strokes are sure to result if the pencil is held too firmly.

CHAPTER V.

Lesson III.

Practice-Charts.

74. **Introduction.**—From the past instruction you should have learned the different movements of the pencil, and also have become thoroughly familiar with the negative as compared with the positive. Beginning with this lesson, we will, when referring to any portions of the negative, give them their technical terms. For example, in the future when speaking of the *shadows*, we will refer to the white (transparent) portions of the negative, which upon the resulting print will appear black. When speaking of the *high-lights* in the negative, you will understand we refer to the black (opaque) portions of the negative, which appear white upon the reproduced print.

75. After having gained control of the different movements, study carefully Illustration No. 9. Figure 1 represents an enlarged section of a face full of freckles; Fig. 2 shows the pencil marks placed on this negative in order to remove the imperfections.

76. **Preparing the Practice-Charts.**—From the envelope accompanying this volume take one of the Practice-charts, No. 1, and place gum stickers on each of the four corners. Allow to set for a minute or so. Next, take a sheet of ground-glass and smoothly stretch the chart on it (face or printed side down), fastening securely to the glass with the gum stickers. This chart, practically speaking, represents the negative. Prepare for retouching as follows:

77. With a cork or toothpick, as previously directed, take a drop or two of the retouching dope and apply it to the parts of the paper chart over which you expect to work.

With a tuft of absorbent cotton, or a piece of Canton flannel, lightly rub over the surface to be retouched, distributing the medium gently in a circular motion, producing a smooth, even surface. This application, as previously stated, gives the negative a tooth for receiving the lead. The dope dries quickly, so you may have to try several times in order to secure the desired results. The surface when correctly prepared must not appear sticky nor tacky, but slightly glossy. If it is tacky—or, in other words, too thick—too much of the fluid has been left on the negative and the lead will take too freely. This is due to lack of rubbing with the cotton. If too little is left on the negative, the pencil will hardly make a mark, when more fluid should be added, repeating the operation. With a little practice you will be able to prepare the negative properly.

78. It is not necessary to apply the dope to any part that is not intended to be retouched. After preparing the negative-chart allow it to stand for a few minutes, permitting the medium to harden. After the practice-chart has been doped and prepared for receiving the lead, place it in your retouching easel, over the opening of the middle section. To hold it in position, attach two thumb-tacks at the base of this opening, thus supplying a support for the negative or practice-chart to rest upon. Next, take a sheet of black or dark paper, about 8 x 10 inches in size, and cut in the center of this sheet, an oval opening about 3 inches long; lay this mask over the negative, which will exclude all light except that coming through the negative.

79. **Arranging the Retouching Desk.**—The retouching desk, as previously instructed, should be placed on a table facing a window, a northern exposure preferred. The correct position at the retouching desk is shown in Illustration No. 7. Observe in this illustration the manner in which the pencil is held, the distance the head is from the negative, and the manner in which the hand and arm rest.

80. If the retouching easel employed is not supplied with a mirror for reflecting the light, then place a sheet of white paper—blotting-paper preferred—on the base of your

Fig. 1
Section of Face Enlarged

Fig. 2
Pencil Strokes Applied to Remove Freckles

Illustration No. 9
Chart No. 1
See Paragraph 25

CHILD PORTRAIT STUDY

STUDY NO. 2

W. G. THUSS

retouching easel, so as to reflect the diffused light evenly through the opening of the desk. When the desk is fitted with a mirror, as previously stated, it will not be necessary to use the paper unless the light is exceptionally strong, in which case the paper will give softer light and will be easier on the eyes.

81. The curtain on the window should be drawn down nearly to the top of the easel, thus serving to cut off unnecessary light. A black cloth may be thrown over the projecting board at the top, so as to hang down at the two sides. All light from the window, with the exception of that coming through the opening in the desk, should be cut off, as an excess of side light will not only bother the eye, but is apt to become injurious, even when diffused. If this precaution be taken, retouching will in no way injure the eyes and you will be able to work much more rapidly.

82. **Removing Blemishes on the Practice-Chart.**—With the negative-chart on the easel, you may next proceed to remove the blemishes, working on the chart exactly as you would on a regular glass negative. All that is required at this time is to fill in the blemishes, using any kind of a stroke or line, working in any direction that will break up the imperfections and blend them with the surrounding tones. Do not fill in these imperfections solidly; there must be a looseness or a sort of texture, which has the effect of producing grain. In many cases a few strokes of the pencil is all that is required.

83. When these blotches, blemishes, etc., have been built up and filled in, there will still remain an uneven, blotchy effect, but you need pay no attention to this, as full instructions will be given in a following lesson regarding the method of blending, which will remove this effect.

84. **When the Lead is Properly Applied.**—The lead is properly applied, when by sitting erect at the easel and viewing the work from this distance the effect of the penciling causes the blemish to gradually disappear; yet apparently, no marks of the pencil are visible on the surface. In other words, the stroke of the pencil should be so light that

it merely blends the transparent blemishes with the main surface. If the lead is applied too heavily you will build the transparent portions above the other parts, which is carrying the work too far. What we *do* want is to even up and blend all surfaces and to stop retouching at that stage.

85. **General Practice Work on Practice-Charts.**—In Fig. 1 of Illustration No. 10, is shown the same head as given in Illustration No. 9, but in regular cabinet-size. After you have practiced on the chart showing the enlarged features, and have become quite familiar with the stroke required to break up the imperfections and have them all of a uniform tone with the parts which surround them, you may then begin to prepare Chart No. 2, which is the negative of Fig. I, Illustration No. 10. Attach this chart to the glass in the same manner as you prepared No. 1 and proceed with the work in the same manner. For working this face you use the same stroke, only on a smaller scale, and a less number of strokes will be required to accomplish the same results, as the face is much smaller in size.

86. In Illustration No. 10 is shown three stages of the work applied to the negative of the same subject as No. 9. In Fig. 1 of this illustration, we have the freckled face untouched. In Fig. 2 is presented one side of the face with the freckles removed, all transparent spots and blemishes filled in, but no attempt made at modeling. In Fig. 3 we have filled in the transparent spots and freckles and also modeled the one side of the face completely, while the opposite side has had only the freckles removed, leaving a blotchy surface exactly as it appeared in Fig. 2. By comparing these two illustrations, Fig. 2 with Fig. 3, you will observe the effect of modeling after the blemishes have been removed. It is not intended that you should make any attempt at modeling at this stage. This illustration is only intended to give you an idea of the appearance of a modeled negative, also to show you more distinctly the effect of filling in blotches and freckles in the face and how the negative will appear with only the blotches removed, with the face remaining unmodeled.

No 1.

No. 2.

No. 3.

Illustration No. 10
Three Stages of Elementary Retouching
See Paragraph 85

Chart No. 2
Reproduction of Practice Print
See Paragraph 85

Examples of Unretouched Negatives — Front view

Examples of Unretouched Negatives — Profile Views

87. *Do not sit too close to your work;* in fact, sit erect and as far away from your work as is consistent with your being able to properly handle the pencil. If too near you will see the actual strokes made by the pencil on the film, and you will not be able to detect any imperfections excepting the most transparent spots. It is not necessary to see the pencil-work, but the *results* produced by the pencil on the surface of the plate. Only the *effect* produced by the pencil is to be your guide. Your eye must become trained to see the imperfections and to judge when sufficient lead has been applied to build them up, blending them with the surrounding tone.

88. If, after your first efforts on any of the charts, your results are not satisfactory to you, again prepare the chart by applying more dope to it and rubbing smooth with cotton. The second application of dope removes the work done and at the same time prepares the chart again for work. Practice should be continued on these charts until you become able to apply the lead to any part you desire. By this time you will find that in place of your directing the pencil upon any portion of the chart, the pencil will, practically speaking, lead the hand and you will, instinctively, direct its movements. When this point has been reached, the most difficult part of retouching has been overcome. This time may not occur while you are yet at work upon the practice-charts, but do not become discouraged at this, for it surely will come sooner or later and when the time arrives and the pencil apparently leads the hand, retouching will become a pleasure. Continued practice is of the greatest importance in acquiring this end.

CHAPTER VI.

Difficulties—Lesson III—Practice-Charts.

89. **What Lead to Use.**—The beginner will find a moderately hard lead the best to employ, as his touch will be somewhat heavy, and if a soft lead is used the pencil strokes will show and too much of the lead will be deposited upon the negative. An HHH lead will be more suitable for the beginner, yet, if with this there is any trouble experienced, due to the lead adhering to the negative and the lines showing too strongly, it would be advisable to procure and use an HHHH lead. Those who have had any experience in drawing, or in fact any work requiring technical skill in controlling the hand, will find the HH lead most suitable, for their touch of hand is light. Those inexperienced are very apt to work with a heavy hand and an HH lead would be too soft, and a harder pencil, say, an HHH, will be more suitable for them, until they learn to acquire a lighter touch. If the lead takes too freely, you will know the lead is too soft for your touch and a harder pencil must be used, and *vice-versa*. One should practice using as light a touch as possible, for the softer the pencil employed the more work you will accomplish in a shorter time.

90. **Sharpening the Lead.**—The proper manner in which to sharpen the lead for retouching is fully explained in the lesson, but if difficulty is experienced, or if the lead breaks off before a sharp point is obtained, the trouble will invariably be due to (*a*) your holding the pencil the wrong way; (*b*) bearing on too hard, or (*c*) moving the lead in the wrong direction. To sharpen the pencil to a perfect point, have fully an inch of the lead protrude beyond the holder. Then (*a*) hold the lead at an angle with the sand-paper or emery-cloth so the taper will extend from the point to the holder; (*b*) bear on the pencil with only enough weight to keep it on the sharpening block; and (*c*) rotate the pencil between the thumb and fingers, at the same time moving it lengthways, *not sideways*, of the lead. A movement to the side will in almost every instance cause the point to break off. To produce a fine, smooth point after sharpening on the sand-paper, rotate the lead on a piece of newspaper, or paper having a similar surface.

91. **Retouching Medium Not Working Properly.**—(*a*) If you have carefully followed the instruction for mixing up the retouching dope or the retouching varnish, you should experience no difficulty in having the lead adhere to the negative. When using the retouching dope composed of balsam of fir and turpentine, should the lead not adhere add a sufficient amount of resin to give a tackiness. About ¼ ounce of resin to 2 ounces of dope will give you a very desirable tooth. (*b*) If the dope is too thick, *i. e.*, if the stopper has been left off the bottle, the turpentine will evaporate and leave a very thick substance which cannot be spread properly on the negative and will not, therefore, hold the pencil marks to the film. The dope should be thinned with turpentine until it is of proper consistency.

92. **Retouching Varnish Not Working Properly.**—While the practice-charts may be flowed with retouching varnish, yet it is advisable to use the retouching *dope* for the charts. The varnish will work better on glass negatives than on the practice-charts. If, when using the retouching varnish, you experience any difficulty, the trouble will be due entirely to your not carefully following the instruction for preparing this medium. It is essential that the gum mastic be thoroughly dissolved or "cut" in the ether, and this must then be poured, drop by drop, into the gasoline, and the whole let stand without disturbing in any way for a period of twelve hours, when it may be used, giving perfect satisfaction. Difficulty may be experienced if you do not rub the dope long enough to thoroughly distribute it over the plate and rub it until it is almost dry. At this stage the dope will become tacky and pull on the cotton as it is rubbed over the plate. Continue to rub in a circular motion, gradually working lighter as you feel the surface becoming more smooth.

93. **Dope Loses Tooth Sometime after Application.**—Although the lead may take well to the negative for a short time after applying the dope, it may occur that after a short space of time the lead will not adhere. This may be due to the imperfect mixing of the dope, or to an insufficient amount of dope being used; or, the dope applied may have been rubbed off the plate by rubbing too hard. If the work is almost completed, to save removing the work already done, the entire negative may be flowed with negative varnish and additional work may be applied over the varnish, which supplies a good tooth for this purpose.

94. **Dope Too Heavy.**—Only one or two drops of the dope should be applied to the average size portrait negative, and this should be placed on the center of the face. With a small tuft of cotton or the tip of the finger, rub in a circular motion, gradually working outward. Continue with this until the dope has become

somewhat dry and begins to pull and get quite tacky. Where the dope is quite heavy, it is important that it be rubbed in thoroughly; otherwise, the lead will take too freely. If the dope is light or thin, then it must be rubbed more lightly, otherwise you will rub off all the dope and will not have sufficient tooth.

95. **Applying the Retouching Dope.**—In the first place, avoid placing too much dope on the negative. Apply a drop or two on the center of the face of the image, and then with a small wad of cotton rub the surface carefully with a circular motion—working from the center outward. Too much dope or insufficient rubbing will leave the film too sticky. Too little dope or too much rubbing will produce a smooth surface that will not leave sufficient tooth, in which case the lead will not adhere to the negative.

96. **Surface of Practice-Charts Tacky after Applying Retouching Dope.**—This is because you have applied too much dope, or did not rub it down sufficiently. If too much has been applied it is advisable to remove it with spirits of turpentine or a little more retouching dope.

97. **Pencil Point Digging Holes in Retouching Chart.**—If you hold your pencil in an almost perpendicular position it is apt to dig holes into the chart. Follow carefully the instructions given in the lessons with reference to the holding of the pencil; in other words, hold it at the same angle as for ordinary writing—do not press on it too hard.

98. **Lead and Dope Gathering on Pencil Point.**—This would indicate that too much dope was used, or the medium was too thick. Under such conditions, apply several drops of fresh dope and with a tuft of cotton rub quite hard. This will remove the old dope and give you sufficient tooth with the new to take the lead nicely. Occasionally wipe the point of the pencil on a piece of cloth, to remove the powdered lead and dope which may adhere to the pencil.

99. **Extreme Point of Pencil Breaking.**—This is due to bearing on the pencil too heavily. Use a light touch, light enough so that there will be no danger of the point of the pencil breaking.

100. **Unable to Vary the Weight of the Pencil Stroke.**—With continual practice on the charts, by carefully balancing the pencil between the thumb and forefinger, and by constantly practicing the wrist and finger movements you will readily overcome this difficulty. Practice the movements given in Lesson II and in a very short time you should be able to apply as much or as little weight as is necessary.

101. **Removing Blemishes in High-Lights and Shadows.**—The blemishes in high-lights as well as in shadows are of different grades of transparency. In high-lights they may appear only

slightly lighter than the surroundings, or they may appear almost like clear glass. Those that appear like clear glass will need a great deal of filling in, while those that are only slightly transparent may be filled in with a very light touch. In the shadows you must at all times work lightly, as it will take only a little lead to fill the blemish and make it match the surroundings.

102. **Lead Will Not Take.**—This is because you have not applied enough retouching dope, or you have removed too much of it with your cloth or cotton when rubbing it with a circular motion. Apply the retouching dope again and do not remove quite so much of it.

103. **Lead Takes Too Readily.**—This is because you either apply too much retouching dope, or do not remove enough of it when rubbing with a cloth or cotton. Remove your retouching dope and again apply, but do not use quite as much.

104. **Why Pencil Strokes Show.**—(*a*) The pencil is too soft. Use a harder one. For the beginner an HHH is preferable. (*b*) Too much pressure is brought to bear on the pencil. You should use a very light stroke; in fact, you should not be able to see the effect of one single stroke. (*c*) An insufficient number of strokes have been used, thus showing each individual stroke. You should use enough strokes to break up the imperfection, and, although there should be a looseness or grain effect, you should not be able to distinguish individual pencil strokes. (*d*) You are sitting too close to your work; so close that you see each pencil stroke, and no matter how close you may place them together you will still detect the pencil strokes. Sit as far away from your work as possible to work conveniently. The eyes should be from 18 to 24 inches from the negative.

105. **Hand and Fingers Become Cramped.**—Unless you grasp your pencil in the correct manner, and have your hand and wrist perfectly straight, your hand and fingers will become cramped. At times the beginner, even if he is holding the pencil properly, will meet with this difficulty. In time, however, he will overcome this. Rest your hand occasionally by laying the pencil down; then close and open the hand a number of times, spreading the fingers apart. Practice will soon enable you to overcome this difficulty.

106. **Wrist Becomes Cramped.**—This is because either your hand or your elbow is not being properly supported. It may be necessary for you to use a cushion of good size under the elbow, or possibly you are using one that is too large. A little practice will soon enable you to assume an easy position and there will be no danger of your wrist becoming cramped.

107. **Eyes Becoming Tired.**—The beginner usually strains his eyes in a vain effort to see the various imperfections. Do not try

to see too much, nor to remove too much at the very first. Take your time and proceed in a systematic way. Remove one imperfection before attempting to work on another. If your eyes feel at all tired, sit back in your chair and place a piece of dark paper over the negative. This will rest your eyes and as soon as they feel easier start in again. Oftentimes the failure to exclude all light, except that which passes through the negative, will cause the eyes to become tired. Be sure that you use a piece of dark cloth over the top of your retouching desk and head, so as to exclude all light except that which passes through the opening in the retouching desk.

108. **What is Meant by "Tooth."**—When we speak of the retouching dope supplying a "tooth" to the negative, we mean that it supplies a surface which readily takes the lead. If there is no tooth the lead will not adhere. If there is too much tooth, or if the surface of the film is too sticky, it takes lead too readily, and it will be impossible to produce gradations with the application of the lead.

109. **Eliminating White Spots or Blemishes without Showing the Lead.**—Only practice will enable you to accomplish this. The lead must be applied so lightly that while the blemish disappears, yet the lead is not visible when the negative is held up against the light. You must be careful not to apply the lead too heavily; in many cases a slight touch of the pencil is sufficient.

110. **What Spots to Remove.**—Bear in mind that the spots which appear white or transparent in the negative are the spots which you should remove. These are caused by a freckle or some other blemish. After these spots or blemishes have been filled in you will find that other spots make their appearance. These should be removed when modeling, not while filling in the transparent spot.

111. **Holding the Pencil Properly.**—The pencil should be held in exactly the same position used by penmen, which position is described in Paragraphs Nos. 53 and 54. Do not grasp the pencil with too tight a grip, for a loose hold tends to give better texture to the work, while at the same time the hand will not become so easily tired.

112. **Looseness of Texture.**—By looseness of texture is meant that a spot or blemish which is filled in should not appear like a solid mass, but the strokes should form a network. If you will make an effort, when filling in spots, to produce this effect, you will produce a looseness of texture.

113. **Producing Texture by Varying the Strokes.**—By varying the different strokes in filling in a blemish, you will not only fill in the spot and remove the blemish, but in doing so you will break them up, as it were, and this breaking up will produce a texture.

CHAPTER VII.

Lesson IV.

Applying the Lead to the Regular Negative.

114. After diligent work on the practice-charts employed for the previous instruction, and having a better knowledge of what is required for the proper handling of the work, you may now proceed to apply the same principles to a portrait negative. Bear in mind, however, that it requires only a very light application of the pencil to produce the desired effects.

Your work on the practice-charts will have taught you how to handle the pencil and apply the lead in eliminating blemishes. You will also have learned the relation of these spots in the high-lights to those in the shadows, and why it requires more lead to remove them in the dense portions (high-lights) and less in the shadows or thin parts.

115. **Practice Negatives.**—The negatives selected for your first work, at least, should be sharply focused portrait negatives, preferably of coarse-featured subjects. It would be an excellent plan to select a proper subject of this kind and make a number of negatives for retouching practice. They must be fully exposed and carefully developed. Should you not be in a position to make these negatives yourself, discarded portrait negatives may be procured from any local photographer. When selecting negatives for practice work, it is advisable to select cabinet plates of good-sized heads and of subjects with as many blemishes on the face as possible, as the beginner will observe his progress more readily on this class of negatives than if plates with less imperfections were selected.

116. **Preparing the Negative for Retouching.**—The film of the negative in its natural state, as you have previously learned, has not sufficient "tooth" to receive the lead; therefore, a preparation must be applied which will supply this tooth and place the negative in a condition whereby any amount of lead may be applied to the surface. To produce this tooth we applied a retouching medium, or, as it is sometimes termed, a retouching dope, instruction for the preparation of which is given in Paragraphs 22, 23, and 24, and the method of applying it in Paragraphs 25 to 28.

117. Prepare the negative with the retouching dope in exactly the same way as instructed for the preparing of the retouching chart. If, after the first application, the surface is not as you think it should be, repeat the experiment until you are able to secure an excellent surface—one that will be smooth and take the lead.

118. With the negative properly prepared for receiving the lead, and before attempting to apply any work upon it, a proof-print should be made. Print to a good depth, so as to show all the imperfections to their best advantage. This print will serve as a guide for you to follow, and must be kept from direct rays of light as much as possible.

119. **Proofing Negatives.**—For the benefit of those who have had no experience in proofing negatives, we supply the following information: The proof is made by placing the negative which is to be retouched in an ordinary printing-frame, with the film side facing up. A piece of printing-out paper, glossy or matte surface, such as Solio or Aristo Platino, is then placed in contact with the film side of the negative, and the back of the printing-frame fastened in position. Regular cabinet-size proof paper can be purchased of any supply dealer, in boxes containing one hundred sheets. When the back has been fastened in the frame, expose the paper to daylight or sunlight until it blackens over in the shadows. With an average negative it will require, if placed in bright sunlight, from 3 to 10 minutes to print to the proper stage.

120. The print should be examined, from time to

time, by opening one-half of the back of the frame and then raising the end of the print from the negative. *This should be done in very subdued light.* Never open the printing-frame in too strong a light, as strong light will, of course, fog the high-lights. Only print until the high-lights are faintly tinted and the blemishes appear quite prominently. Then the printing is completed and the print may be taken from the frame.

121. With the proof obtained, next place the negative over the opening in the retouching desk and with the pencil properly sharpened to a fine point, you are ready to begin your work. Cover the negative with the black mask containing the oval cut-out. This will prevent finger marks on the film and will assist in concentrating the light on the part which is to be retouched. Before beginning the work, just remember that, on the practice-charts, the strokes of the lead when applied to the transparent blemishes, produce dark lines, the density of which depends upon the weight of the stroke. This lead, when applied to the negative, also gives dark lines, and when shown in the positive print made from the negative, reproduces white; consequently, when referring to these lines on the negative, we speak of them as white lines.

122. **The Position.**—Retouching requires quite a steady hand, and to acquire this, an easy, unrestrained sitting position is necessary. Select a chair of a height that will permit of the elbow resting comfortably on the table, allowing the hand and pencil to rest on the mask and negative. If the hand perspires freely, a handkerchief may be used between the hand and plate, on which to rest the fingers. A small pad or cushion may be placed under the elbow. Sit quite erect in the chair, resting comfortably, and do not bring the face too close to the negative, but just close enough so that you can see all the blemishes. The farther away you can work and see the blemishes, the better.

123. To start with, we would advise that you begin the work at the highest points of light on the negative (the

blackest or most opaque portions). In some portion of the high-lights select a large freckle or blemish. Make no attempt to fill it up solid, but break it up, so to speak, by applying different strokes of the pencil.

124. **The Stroke.**—The spots and blemishes, being of different shapes and sizes, will require different strokes of the pencil. Some portions may require a series of straight or slightly curved lines placed quite close together, and crossing each other so as to break up the blemish rather than to fill it in solid. Small blemishes may be easily removed by using one or two small commas. Various workers have different methods of handling these imperfections, but there is no marked advantage in any one particular form over another. Whatever stroke you use it must be such that you cannot see it when the negative is held a foot from you, nor must the strokes be visible in the print. Three or four strokes will often suffice to make the average freckle almost unnoticeable. Always guard against placing too much lead on the negative; strive to remove the imperfection completely, using as few strokes as possible. *The weight of your stroke* will govern this to a great extent.

125. Use any movement you see fit. It makes no difference how you perform the work, so long as you produce the results of filling in and smoothing over. *Always steer clear of the edge of the spot,* for to touch the edge would intensify the outline, consequently, requiring more work on the original blemish. Some of the blemishes or blotches may require only a dot of the pencil; others the spreading of a dot, a zig-zag line, or a curved line or several strokes. The lead must be applied so lightly that while the blemish disappears the strokes are not visible when looking through the negative.

126. Do just as little retouching as is required in each case—too little is better than too much. It will be found advisable to apply different forms of strokes for various shaped spots or blemishes on different parts of the face. You will soon have a preference for one form of touch over another—finding that this form gives you the greatest

amount of control. More or less unconsciously this will become your method. It is much better to work in this manner than to try using one particular form of stroke from the start. The actual results in retouching do not lie in the particular form of the stroke, but in your being able to use that stroke to secure the required result.

127. One important point you must remember: *Never permit the lead to touch any portion of the plate which you do not expect to strengthen.* A properly retouched plate, when examined by *transmitted* light, should show no marks of the pencil on the surface. (**Note**: Transmitted light is that light which comes *through* the negative.)

128. When you apply the lead to the negative, bear in mind a very important fact: The lead is applied to build up those portions which are transparent and of less density than the main surface of the plate. You must exercise care, therefore, not to apply too much lead. Also remember, that to touch the outline or high-light portions of the blemish, which are the black portions, will intensify these outlines and make them still stronger—this you do not want. What you do desire is to build up and blend only these higher lights. Therefore, avoid working beyond the edge of the blemish. Apply the lead only to the white transparencies, or, giving them their technical term, black blemishes.

129. Beginning with the center of these blemishes, freckles, lines, or whatever they may be, gradually blend to their edge, connecting them with their surroundings. As previously stated, some of these spots may be very small and require but very few strokes of the lead; others are larger, requiring longer strokes. In any event, never attempt to work beyond the outline of the spot or blemish. If the spot is an irregularly shaped one, follow this shape with the pencil. Do not leave out the corners, but work with any stroke that you find will erase this spot and even it up with the rest of the work. After you have completely finished one spot, take the one nearest to the one already removed and continue with every spot in regular order

until all have been removed. These blemishes and spots you will observe, are not of the same density. Some are blacker (using their technical term) than others. Therefore, you must apply the lead accordingly. The less conspicuous the blemish the lighter you apply the lead.

130. After removing the most conspicuous spots that are visible to the eye, lean back from the easel and take a general view of the entire surface of the face. You will observe in many instances where you have worked over and filled small spots, you have created larger blotches; that is, you have connected small spots which were more transparent than the larger ones. The latter were invisible to the eye, but after the small spots were removed or eliminated, the larger blotches became visible. In other words, while the large blemish was always present, yet the more obtrusive little spots, pimples, etc., attracted the eye first, so that you did not notice the larger one which was very mild and subdued.

131. From the fact that this larger blotch—which you have created by the removal of the smaller blemishes—is much larger and milder in appearance, you must lean back farther from your work and, using a longer and lighter stroke, go over the surface you have already worked upon. Fill in this large space and blend it with the remaining surface. Very few of these large spots—which are created from the elimination of smaller spots—will require more than a half-dozen strokes of the pencil.

132. Practically speaking, the blending together of the created spots is termed *modeling*. It is not desired that you attempt to model at this time. Our object is only to prepare you for the advanced work by calling your attention to these blemishes so that you will observe them as you progress with your practice work. Therefore, all we expect you to do in this lesson is to fill up and blend these little spots, remembering at all times that it requires but very little weight on the pencil to produce the desired effect. Rather depend upon the retouching fluid, which supplies the tooth to take the lead, than upon the pressure of

the hand. Practice eliminating and building up the blotches and blemishes of the face, bearing in mind that the larger the blotch or freckle the longer should be the stroke of the pencil.

133. Never permit the pencil to touch upon the high-lights—in other words, the outline of the blemish. Remember at all times that the object of retouching is to model and smooth over the defects, connecting them with the higher lights, thereby producing an even and clear texture of the skin.

134. After a careful trial you may find that your work is not producing the desired effect; that it is entirely too heavy and coarse, and that the lead which you have applied has not improved the plate, but, on the contrary, makes the work appear extremely crude and very unsatisfactory. Do not become discouraged on account of this, but erase the work you have done by carefully rubbing over the plate a little absorbent cotton dipped in turpentine. Allow it to dry, after which you can again prepare the plate with the retouching fluid. If so desired, the retouching fluid can be substituted for the turpentine. Apply a few drops of the fluid and spread it with absorbent cotton or Canton flannel, thereby erasing the lead previously applied and at the same time preparing the plate for further retouching. After a few moments the plate is again ready to receive the lead, when you may proceed carefully, as before, and profit by your former experience.

135. After you have removed the blemishes in the highest points of light, gradually work down through the half-tones and into the shadows. Of course your strokes must gradually become lighter as you proceed to the thinner or shadow portions of the negative.

136. By the time you have completely removed the blemishes you should have made three or four proofs and compared them with the proof made before any work was applied to the plate. This will give you an exact idea of the effect you are producing with your pencil, and also

clearly show whether or not you are placing too much lead on the plate—whether your strokes are sufficient to remove the imperfections without showing their identity.

137. If you apply too much lead on one spot it will gradually become glazed over and no more lead will adhere. This difficulty will often occur with beginners and should you experience it, instead of erasing the work already done by applying more retouching dope, flow the plate with the retouching varnish, as previously described in Paragraph No. 93. By using this medium there will be no danger of removing the retouching you have placed on the negative, which would be the case if you applied the dope. You may now continue to apply more lead in the quantity necessary to remove the imperfection.

138. All of the proofs which you make should be filed in the proof-book, or proof-file, and full data placed on the back of each proof as to the method you employed and the manner in which you proceeded to remove the imperfections. This memorandum is of the greatest importance, as you may desire to refer to it at any future time. By keeping the proofs in your file away from the light, they will remain in practically perfect condition for an indefinite period of time.

CHAPTER VIII.

Difficulties—Lesson IV.

Removing Imperfections on Negatives.

139. **Note.**—Many of the difficulties which may be encountered in preparing the work of this lesson are from the same cause as those given in previous instruction, and in case you meet with any difficulty for which no remedy is given in this particular lesson, refer to the index, which will direct you to the lesson and paragraph wherein you will very likely find your difficulty, prevention and remedy. Only such difficulties as are not covered in previous instruction will appear in this department.

140. **Applying Dope.**—The dope should be applied by placing one or two drops on the center of the face of the negative, and this rubbed in a circular motion with a very small tuft of cotton or the tip of the finger. Gradually work outward, then back toward the center and outward again, until the dope has become very nearly dry, or until it becomes very tacky. Be careful to avoid any line forming at the outer edge of the area covered by the dope. If in applying the dope you gradually work outward from the center there will be no perceptible line at the edge of the space covered by the medium.

141. **Applying Varnish.**—The greatest difficulty that will occur when applying varnish to the negative will be caused by pouring from a bottle having too small a mouth. Always keep the varnish in a wide-mouthed bottle. Hold the lower left corner of the negative in your left hand. Pour just enough varnish on the farther right-hand corner to gradually cover the plate. Tilt it first to the left, so that the varnish will run into the farther left-hand corner; then tilt toward you, and finally to the right, allowing the varnish to run off into the bottle at the right-hand corner nearest you.

142. **Line Around Edge of Dope.**—This will be caused if you do not apply the dope in a circular motion and gradually work outward from the center. With a little practice you should experience no difficulty in this respect.

143. **Cannot See Imperfections.**—(*a*) You are sitting too close

to the negative, and you see the pencil stroke but cannot distinguish the more delicate imperfections. Sit more erect and far enough away from the negative to allow of your working comfortably. The eyes should be about 18 inches from the negative. (*b*) There may be too much light entering at the sides of your desk and falling upon the face of the negative. All light should come through the opening in the desk and practically all excluded from the sides or back.

144. **Proper Light.**—No direct light should strike the film side of the negative. The light must be transmitted through the negative by the opening in the desk. An opaque cloth may be thrown over the top of the desk and head. This will assist in excluding all direct light and permit of your seeing the imperfections more easily; also, your eyes will not become tired, as they might if any light were reflected from the surface of the negative. All light for retouching should come *through* the opening in the retouching desk.

145. **Lead Scratching.**—(*a*) Sometimes there are impurities or hard places in the lead which cause scratches. If these occur you may remove them by rotating the pencil on the piece of emery paper until the hard spot is removed. (*b*) The pencil may be too hard. It is very seldom advisable to use one harder than HHH, and for those who have a light touch even this pencil will be too hard and at times will scratch. An HH or even an H lead may be used very successfully. (*c*) The dope may not have been applied properly, or, if retouching varnish were used, it may not have properly dried. In either case you should be sure that the medium is properly mixed, rightly applied to the negative, and allowed to dry before you attempt to do any penciling. (*d*) Negative damp when medium was applied. The negative must be absolutely dry before applying either retouching dope or varnish. If it is not thoroughly dry the gelatin emulsion will be somewhat soft and the lead will not adhere, and frequently will dig into the emulsion, even though the negative be properly coated with the medium. (*e*) Should the negative become too warm—*i. e.*, if you should work in too warm a room—the medium, unless well rubbed into the film, is liable to be left too gummy—tacky—and the pencil will dig into the medium rather than deposit the lead upon the negative.

146. **Eyes Becoming Tired.**—(*a*) The beginner will usually strain his eyes in a vain effort to see the various imperfections. This is not at all necessary. In fact, its practice is to be discouraged. Sit back in your chair and proceed to work in an easy manner. Do not try to see too much or to remove too much at the very first. Take your time and proceed in a systematic manner, removing one imperfection before attempting to work on another. (*b*) The eyes will become tired and in time may give you

trouble, if you do not exclude all light from the film side of the negative. You should provide an opaque cloth thrown over the retouching desk and head, so as to exclude all light from the negative which would cast reflections into the eyes. The only light visible should be that which comes *through* the opening in the retouching desk.

147. **Position at Desk Tiresome.**—Do not have your chair too far away from your retouching desk, as this will necessitate your leaning forward, and this position soon becomes tiresome. Have the chair close enough to the desk to permit of your leaning against the back. Then, sitting at almost arm's length from the negative, you will be able to work for almost any length of time without becoming at all fatigued.

148. **Fingers and Hand Become Cramped.**—The pencil should be held loosely in the hand, and you should proceed to work in a free and easy manner. If you hold the pencil too tightly, the hand will soon become cramped and you will not have a free movement of the pencil.

149. **Wrist and Forearm Become Tired.**—It is advisable to have a cushion under the elbow, which will raise your arm to exactly the right position for work. If this is not done the forearm, and even the shoulder, will soon become tired. Both the elbow and wrist should rest in such a way that you may work indefinitely without their becoming at all tired. Cultivate working in the easiest position possible, always sitting erect. This might at first appear awkward to you, but if you do *not* work in this way you will soon become tired, and the hand is apt to become unsteady. There is no need of your being nervous if you use judgment and follow the instruction. It is advisable, especially for your first experiments, to work only a half-hour at a time and then to rest, walking around for a few minutes. Forget your work for the time being, and when you again take it up you will feel somewhat refreshed and not at all tired.

150. **Finger Marks on Negative.**—The negative should always be covered with the mask, as this will protect it from finger marks. The mask may be made of black or any dark paper; a hole two or three inches in diameter should be cut in the center of an 8 x 10 piece of paper. The mask may be held in position by tacking the upper edge to the desk.

151. **Cannot Remove Blemishes.**—When working on freckles and extremely transparent portions of a negative, some difficulty may be experienced in building up the transparent spots sufficiently. This may be due to one of two reasons: (*a*) You are working with too hard a lead. (*b*) You are working too lightly and glaze over

the surface before a sufficient quantity of lead has been deposited. The remedies for these difficulties are: (*a*) Use a softer pencil; (*b*) apply the lead heavier.

152. **Imperfection Becomes Too Black.**—This is due to either using too soft a pencil or working too heavily. The remedy is obvious. Build up the imperfection until it just matches the surrounding tint. Remember, that the blemish is not to be filled in solid, but it should be broken up with strokes that will leave a slight grain effect. When the imperfection is simply a pin-hole in size, one little touch with the point of the pencil may remove it. A stroke conforming in shape to a comma is very effective in removing both large and small blemishes.

153. **Removing Retouching Medium.**—If too much lead has been applied to the negative, if you have worked on portions that should not have been touched, or if for any reason it is desired to remove the work and begin anew, apply a few drops of the regular retouching dope and with a tuft of cotton or Canton flannel cloth rub over the surface. This will eliminate all the work done and will also again provide the plate with a tooth upon which the lead may be applied. If retouching varnish has been employed instead of the dope, gasoline is the best substitute to use in order to remove the retouching. The cotton should be moistened, but not saturated with the turpentine or gasoline, yet you must use enough of either one or the other to wet up the retouching medium and remove it. Continue rubbing and wiping with the cotton until the medium has been completely removed, then rub dry with clean cotton, after which the plate may again be varnished, or, if desired, dope may be substituted for the varnish.

CHAPTER IX.

Lesson V.

Blending.

154. By blending is meant the linking together (uniting) of the different blemishes which have been evened up with their immediate surroundings, and bringing them gradually into correct relation with the different planes (tones) of lighting on the face.

155. Having worked over a number of negatives, you now should have gained considerable experience and be thoroughly familiar with the way to remove blemishes in the most effective way and with the least number of strokes. The next step is to blend and build up the little shadows and the patchy, blotchy effects which still remain.

156. Your previous work on the practice negatives, eliminating spots, lines, etc., to a certain extent produced others; *i. e.*, by filling in the blemish even with its surroundings, you have done so regardless of the tonal values of the face. Thus the eliminating of a group of little spots on a certain patch of the face left spaces between these spots untouched, which may or may not blend evenly with their surroundings. The blotches usually being of a neutral tone do not appear conspicuously until the more prominent blemishes have been removed or eliminated. Then they begin to show quite blotchy, and it is these that you must now connect together and build up, blending them in correct relation with the different tones of light on the face.

157. In carrying out the work of this lesson, select one of the practice negatives, or in the absence of glass

negatives you may use the practice-charts, from which you have previously removed the blemishes. If you have not previously done so, make a good strong proof-print from this negative, after which remove the work applied to the plate and again make a proof from the negative in its unworked stage. Carefully file these proofs for your guide in the work of this lesson. With both proofs made you again prepare the plate with the retouching medium. This may be done at the same time that you remove the work of the retouching already done on the plate. By applying retouching medium to remove the lead applied, you at the same time again prepare the plate for work.

158. With the plate prepared you can now proceed to remove blemishes in exactly the same manner as previously instructed, only that, after eliminating a number of the most conspicuous spots on a small space, you begin at once to blend together all of the work in this space, gradually building up to the highest surrounding tone.

159. It is always advisable to begin work upon the strongest high-lights, gradually working downward, blending evenly into the shadows. As the forehead bears the highest point of light, we will begin our work here, first eliminating all the little spots, specks, lines and blemishes that are conspicuously visible in the forehead. With these blemishes removed—filled in, etc.—sit back from the easel and observe the general appearance of the space you have worked over. Notice that while all conspicuous blemishes and spots may be eliminated, their elimination has caused larger blotches to appear, which were previously invisible, or, at least, unobserved. These blotches are represented by the spaces between the numerous more pronounced spots. Until these spots are removed, the normal blemishes between the conspicuous spots are not revealed. Therefore, by filling in and eliminating the more noticeable blemishes, you, practically speaking, create larger ones, which become noticeable and must be blended together. This blending produces an even surface to the whole space you have worked over.

CHILD PORTRAIT STUDY

STUDY NO. 3

J. WILL TOWLES

PORTRAIT STUDY

STUDY No. 4

JOHN H. GARO

160. While the work of blending requires careful application, yet the actual work is most simple, as the necessary strokes for the blending may be much longer and more irregular in form. In fact, the only precaution is to avoid working heavily; the blending *must* be done very lightly. Practically speaking, you may work promiscuously, using straight lines, curved lines or zig-zag lines—preferably the latter.

161. When blending a space, always lean back from the easel so as to obtain a general view of the space you have worked, then freely but lightly apply the lead. Don't be afraid of mistakes, for confidence plays an important part. One should aim to acquire this confidence and it can be gained only by working firmly. At this stage you can proceed in a free and apparently careless manner; in fact, make no effort to produce any particular stroke, but work to produce results.

162. Experiment by employing different movements, even though you feel the work already done will be ruined. The right method can be obtained only by this experimenting, and as the failures, such as applying the lead improperly—on places where it should not be applied—or overworking the space, are readily apparent, it is easy to judge when the space is evenly blended. After some little practice you will be able to apply just the amount of lead necessary to produce the required results.

163. As stated in a former chapter, the pencil will invariably lead the hand when you have gained confidence in yourself and unconsciously you will apply the right amount of lead to the right place. At this stage you can do no better than practice any movement, even allowing the pencil to take its own course, but keep it within the limits of the space you wish to blend. After a few attempts and perhaps erasing your work once or twice, you will be able to apply the lead properly.

164. After having blended the forehead satisfactorily, proceed to the cheek on the light side of the face, working in exactly the same way as you did on the forehead. Al-

ways begin on the highest point of light—the most opaque portion—and work from this point downward to the deepest shadows, first removing the most conspicuous spots and then blending the cheek with the forehead. With this accomplished, continue on the remainder of the cheek, working in patches of say half an inch at a time, blending each patch to the work previously done.

165. You will observe the light on the face is not all of the same tone. There are strong lights and middle lights, as well as deep shadows. The various degrees of light between the highest light and the deepest shadow are termed half-tones, all of which have their value and must be preserved in their relative order. Therefore, when working in the strongest lights bear heavier on the lead than when working in the half-tones, or middle lights, and very lightly in the deepest shadows. When blending you must hold to the tonal values of the face, thus preserving all the tones or values of the lighting as well as the likeness of the subject.

166. There are times when negatives of subjects with sunken cheeks or hollow eyes may be improved by building up these hollows and blending them gradually to the next higher tones. Complete instruction regarding this will be found in a more advanced chapter of this volume.

167. With the forehead and high-light cheek nicely blended, next proceed to the upper lip, then the chin, working down into the shadow and over onto the neck. This will complete the high-light side of the face. Next proceed to blend the shadow side. Blending on the shadow side of the face is a little more delicate work and requires very careful application of the lead, as the negative is much more transparent and the pencil strokes will show on the surface unless you apply the lead very lightly. Do not expect to eliminate the spots with one or two strokes when blending them, for it may require considerable work. Bear in mind, when working on the shadows (thin transparent parts), you must work lightly and the pencil marks must not be visible when viewed on the plate in the easel, but the effect of the work applied should become apparent

by the disappearance of the blemish. It may require a number of strokes to show any perceptible disappearance of the spots or the necessary blending of the blemishes. Therefore, when working on the shadow cheek follow the same method as employed on the high-light side.

168. Begin on the highest point of light on the shadow cheek and first remove the most transparent spots; then connect the cheek to the forehead by blending with a longer, but much lighter, stroke of the pencil. The shadows being more transparent than the high-lights the spots will appear more transparent, yet they are not so deep and do not require so much work or application of the lead to build them up to their immediate surroundings. For this reason a lighter stroke is employed to eliminate these spots and also to blend the blemishes to the regular tone.

169. When you have the first patch blended with the work previously done on the forehead, make a proof print from the negative and then proceed to build up all additional patches, connecting them as you work along.

170. **Working Around the Face.**—To a certain extent the face is round; but the negative being a flat surface, all the features appear on the same plane. The nose, for instance, is apparently on a plane with the ear—it does not stand out from the negative. One of the aims in retouching is to secure atmosphere, or roundness; therefore, try to produce this by working around the face. With a little practice you will unconsciously turn the hand and tilt the pencil slightly, as though the face really did project out of the plate and you were working on the side of it—reaching around the face as it were. When this impression of the work is acquired, or when you consider the negative in this light, you will begin to work with some feeling and understanding as to what is actually required. You will then more readily observe the tonal values as they appear on the face.

171. You will also appreciate why there is a high-light followed by a shadow in every wrinkle on the face, and in eliminating spots and blemishes, why it is necessary to

work the shadows (transparent parts) and blend them with their outlines or high-lights, *but no more.* Further than this, you will observe that by means of the proper gradation of light the chin is made prominent—projecting from the face—and by means of the shadow from the chin the neck is clearly defined. All this will become quite clear and understandable to you; then retouching will become more interesting and the advanced instruction will be clearly understood and rapid progress made. In fact, when this stage is reached, the most difficult part of the art has been accomplished and your further work will be completed almost by instinct.

172. The instruction and practice work of this lesson is intended to train you in the work of *blending,* and incidentally give you some impression of the tonal values of the face, which must be preserved. This will be particularly dealt with in the following instruction.

173. The work on the nose, eyes and mouth is the most difficult, and, for this reason, no attempt should be made to work upon them at this time. The broader surfaces of the face, such as the cheeks, are easier to work, and the required results more readily produced. Therefore, for the practice of blending, the working of the forehead and cheeks is all that need be attempted.

174. Devote as much time as possible to the practice of blending, making proof prints of your work at different stages, so you may note your progress. It is by careful comparison of the proof with the negative upon which you are working that you will learn the effects of the penciling.

175. Remember, it is essential to begin at the highest points of light, no matter on what section of the face you are working. With the beginner the stroke is invariably heavy, and the light touch is not easily controlled; therefore, as it usually requires more lead to build up the high-lights than the shadows, the first strokes may be placed on the former without any danger of their showing too heavily. As you continue you will gain better control of the pencil,

and as you gradually work down into the shadows you will be able to use a lighter touch, and thus properly blend into the more transparent portions of the negative.

176. Follow the directions closely and work conscientiously; then, sooner or later the work will become simple and easy. It is advisable to practice upon the same negative several times, until you become able to accomplish the required results.

177. Always make proof-prints from each plate before erasing the work done. These proofs serve as your guide, and will prove of valuable assistance to you. Do not proceed with the more advanced instruction until you have acomplished the blending of different sections, for this is the most difficult part of the work; but when once accomplished, the work becomes a pleasure.

CHAPTER X.

Difficulties—Lesson V—Blending.

178. **Strokes of Lead Showing Too Prominently.**—Caused (*a*) by bearing on too heavily; (*b*) by using too soft a lead; or (*c*) by sitting too close to your work. (*a*) The pencil should be held loosely in the hand. (*b*) The beginner should use at least an HHH pencil, and after considerable practice may be able to use the HH. The change from the hard to the soft lead should not be made, however, until you have full control of the stroke. (*c*) Do not sit so close to the negative that each individual stroke is seen. Sit erect, with the eyes fully 18 to 24 inches from the negative.

179. **Working Away from Highest Lights.**—When connecting little patches of work blend and connect each with the higher lights. Begin by working a very little, close to the highest point of light (until you blend the work even to it); then gradually blend away from it until the blending appears uniform toward the next stage of light. By blending downward, following the angle of light on the face, you avoid working in steps, as the work should be lighter as you near the lower or shadow portions.

180. **Eliminating Transparent Spots Without the Lead Marks Showing.**—In order to accomplish this you must first work lightly. If the light stroke does not eliminate the spot go over it again, applying the lead a little heavier. You must remember that the retouching medium supplies the tooth by means of which the lead takes to the spot. When the lead is applied too liberally you will find yourself working on a lead surface which has become smooth and has no tooth, finally causing the lead-work to become somewhat transparent. You should judge the weight of the stroke by the density of the spot. If very transparent you may apply a heavier stroke than if only faintly visible. By applying a moderate amount of lead with each stroke you avoid overdoing the work. It is always advisable to apply the *first few strokes* lightly, until you can judge, by the results of the light strokes, how heavily you may apply the lead. When the lead is applied too heavily, the stroke will show on the surface (when viewed by transmitted light). It

is, therefore, better to work lightly over the spots several times than to have the strokes show. With very small spots you will find the mere dot of the pencil will be sufficient to eliminate it.

181. **What Spots to Remove.**—The spots to remove are those which appear white or transparent in the negative. They may be freckles, pimples, blotches, wrinkles or any other blemishes on the face. After these spots have been removed you will find that other spots will make their appearance. These will also have to be eliminated, and it is their removal that is termed *blending*. Longer and more frequent strokes are employed for this part of the work, but you should be careful that the stroke does not go beyond the space you are blending. It is far better to use a short stroke and have perfect control of it, than to go to the other extreme and not secure the proper result.

182. **Holding the Pencil Properly.**—The pencil should be held in the same manner as you would hold it when writing, but not as tightly. The strokes should be made freely and lightly. With a little practice you will soon adopt the position which is the most natural one for you to use.

183. **Dope Seems Too Tacky.**—You have either applied too much dope; you have not rubbed it long enough to distribute it properly over the surface of the paper; or the dope has become too thick. One or two drops applied in the center of the face will be a sufficient quantity of the medium. It must be rubbed in a circular motion with a tuft of cotton until it is well distributed over the entire face. Gradually rub outward, continuing the circular motion, so there will be no perceptible line at the edge of the dope. The stopper should not be left off the bottle. If the medium should become thick, setting it in a warm place will often thin it. If, however, it does not do so, add a few drops of spirits of turpentine direct to the dope, thoroughly mixing them.

184. **Lack of Sufficient Tooth.**—If you do not use enough retouching dope the surface of the plate will be too smooth. If you work too long on one spot on the negative the film will become smooth and not take the lead. The only thing to do in such a case is to remove all the work and begin over.

CHAPTER XI.

General Modeling.

Introduction.

185. When posing and lighting the subject and making the negative, the photographer should have put forth every effort to secure the very best lighting effect possible, and to produce a characteristic likeness. If this initial step has been given its proper amount of consideration the retoucher will have been saved an immense amount of work.

186. Properly controlling the source of light, correctly posing the individual, giving proper exposure, and, finally, developing the plate to obtain what was seen under the light, will in almost every case eliminate fully one-half the amount of retouching necessary to give a negative which will do justice to the subject and produce an artistic print. If this has been accomplished the modeling and character of the individual has been retained. When the photographer has failed to perform his part, then it is the retoucher who must correct the error and secure proper modeling.

187. Your previous instruction has acquainted you with the strokes required and taught you how to apply the lead properly, touching out the blemishes, etc. You have also learned that by eliminating the many spots, blemishes and pimples a larger spot has been brought into view. This, in turn, you have learned to eliminate by evenly blending the entire surface. You may have blended these blemishes without any regard to the drawing or modeling of the face, and, partly, for this reason your next instruction will deal with this most important part of retouching—*Modeling and Re-*

taining of the Character, (working on lines which are the distinguishing marks of the character of every face). *Modeling,* briefly defined, is the shaping and forming of the features of the subject and retaining all the character that is already in the negative.

188. A good artist is known by his successful modeling. The sculptor first roughly moulds the features of his subject in clay, which he afterwards models by smoothing down the hollows and the prominent angles. The artist painter models his subject by means of the brush. For the *retoucher* the image is already in the negative, with the lines, blemishes, imperfections, etc., somewhat exaggerated; these must be softened or eliminated. To him, therefore, modeling is not only the shaping but the retaining of what exists in the negative, and the softening of the more obtrusive lines, as well as blending and modeling them to give the most characteristic likeness, with all hard lines subdued.

189. All faces, no matter how sharply featured they may be, contain curves which must be retained. Observe the forehead, nose, cheek, lips and chin. They are all composed of some kind of curves, the character of which is governed largely by the lighting of the subject. When the negative is made these features and curves may be emphasized, to a certain degree, in the lighting of the subject.

190. The majority of lightings and most especially broad lightings, give character and roundness to the face. The highest point of light is on the forehead, the next strongest on the cheek, the next on the nose, the lips and the chin, while the drapery is in a still lower tone.

191. In comparing these lights at their different points you must do so with the illumination falling on the *high-light side* of the face, and not on the shadow side. The *shadow side* of the face has some points of light which are in a slightly higher key than others, but these high-lights are much lower in tone than any light on the light side of the face. This balance of light and shadow is what supplies roundness, atmosphere and perspective. Every object has its high-light and deepest shadow, as well as

intermediate tones. The gradations between these extremes must be preserved in their relative values. This is done by properly modeling the negative.

192. The removal of the first blemishes and imperfections is always required. It is also necessary to blend and thus eliminate any harsh lines, which are usually prevalent in the portrait negative, owing to the fact that the plate has not recorded the various colors and tints in their respective values.

193. Modeling is an extremely delicate part of the work, and you must have a thorough understanding of what is required before you can expect to proceed farther.

194. It is very seldom that the face is focused microscopically sharp—so sharp that the pores of the skin show to any perceptible degree. There are times, however, when the pores in the front of the face may be observed in the negative and the texture of the skin shown to a great extent. It will also be noticed that, as the face recedes from the front, instead of presenting a view of the open pores, only the sides or edges of the pores are seen. Still farther back, toward the ear, no texture or grain will be apparent. There are three reasons for this: *First,* the pores in the front of the face, being viewed broadside, are naturally larger than those on the sides; *second,* the front of the face is usually in the sharpest focus; and *third,* the roundness of the face permits only the sides of the pores to be seen as the face recedes.

195. A properly lighted portrait, in which the majority of the face is in light, will have the light on the features and parts of the face nearest the camera. It is here that the pores of the skin will show most prominently, and, as you begin to retouch in these parts, your stroke in modeling may be longer than in any other portion of the face. A *long stroke* will give a coarser grain, while a *short stroke* produces a finer texture. As you proceed to work down into the shadows your stroke may become longer, and, of course, must be much lighter. Working in this manner you will produce an atmospheric effect or roundness which

an even texture over the entire face would ruin. *Uniform texture always tends to flatten out the features.*

196. **Contrasty and harsh lightings** will require considerable blending and modeling, for the half-tones, as well as the shadows, need to be built up in order to harmonize with the relative tones in the high-lights. Under-exposure will necessitate this same treatment. A properly exposed negative, which has been developed so that the highest point of light is of good strength, yet mellow and not hard, is the ideal negative to retouch; for if the lighting were correctly made, with good modeling throughout, the gradation between the high-lights and shadows will be practically perfect.

197. **Character Lines of the Individual Must be Retained.**—In modeling, there is one feature in particular which is very often neglected and entirely lost sight of by the average commercial retoucher. *It is the preserving of the character of the individual.* This is of vital importance, and there are cases in which the unskilled retoucher is responsible for much more harm than he is aware of.

198. For example, you may have a negative of a subject with strong lines in the forehead, running either horizontally or perpendicularly. In the latter case they usually will be between the eyes. These are character lines and must be preserved. They may be modified, but by no means removed. To eliminate them would change the likeness and thus misrepresent the subject. These lines, of course, are more noticeable on men's faces; however, it is permissible to soften the lines to a greater degree on faces of women. It is true, some subjects like to be idealized and you must please them. This can be done by simply subduing the heavy lines, yet holding the likeness.

199. Many times men are distinguished by some feature of the face. To change or subdue such a feature to any marked degree would ruin the likeness. When you once become expert with the pencil you will find there are many ways of idealizing the subject and yet retaining all likeness. You will be fully instructed regarding this in the more advanced lessons of this volume.

200. There are no two faces similar, nor any two expressions just alike; therefore, you should not work in the same manner on all. A general study should be made of the negative before attempting to do any work upon it. Have a regular plan of procedure. First, proof the negative in its original state; then determine what character has been expressed in the negative. If there are any defects which should be removed decide upon the manner in which to proceed. Preliminary study will save you much time and actual work, for if you start in at once to pencil on the negative regardless of likeness you will make many strokes in the wrong place, and, consequently, more strokes will be required to cover your first errors. Such additional work will tend only to over-retouching and destroying of character, as you will build up features or portions which have no right to be in as high a key as you have made them.

201. The beginner will invariably apply more lead to the negative than is required. He is not sure just where to place his stroke, nor has he gained sufficient experience to apply the proper weight to the pencil; but a little experience will acquaint him with the requirements and he soon will be able properly to remove blemishes and imperfections, as well as to blend and model with comparatively few strokes. It is extremely essential that the beginner work slowly, as the hand is able to perform the work more readily than the untrained eye can see what is necessary to be done. By experience, however, the eyes become trained to observe defects which previously were overlooked, and seeing these more readily tends to assist in controlling the application of lead. You will also perform the work much more rapidly and with greater ease.

202. As each prominent feature of the face requires special treatment in itself, instruction will be given in the methods for handling each in their regular order. You will readily observe that there are wonderful opportunities for the skilled retoucher to show his ability and produce results which the unskilled workman would consider impossible.

202*a*. **Muscles of the Face and Neck.**—As it is very essential that the stroke in modeling follow the general trend of the muscles, rather than to make the strokes crossways, the accompanying illustration No. 10*a* should be carefully studied.

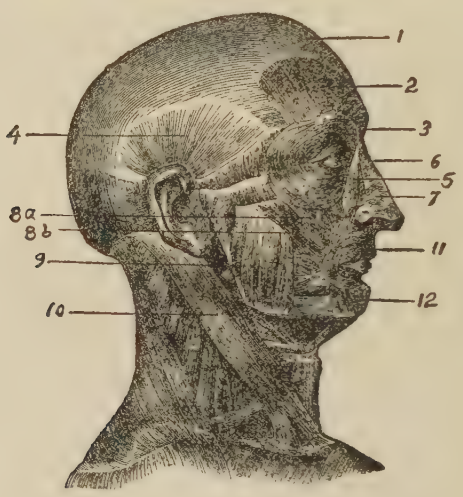

Illustration No. 10*a*.
Muscles of the Face and Neck

Fig. 1—Occipito-frontalis moves the scalp.
Fig. 2—Frontal portion muscles contract skin of forehead.
Fig. 3—Orbicularis Palpebrarum opens and closes the eyelids.
Fig. 4—Temporal Fascia assists to raise the jaws.
Fig. 5—Levator Labii Superioris Alæque Nasi gives action to the lips.
Fig. 6—Pyramidalis Nasi changes the form of the nose.
Fig. 7—Compressor Nasi changes the form of the nose.
Fig. 8*a*—Zygomatic Minor. } Muscles over cheek bone.
Fig. 8*b*—Zygomatic Major. }
Fig. 9—Masseter assists to raise the jaws.
Fig. 10—Sterno-cleido-mastoid causes the head to move.
Fig. 11—Orbicularis Oris runs around the mouth and gives action to the lips.
Fig. 12—Levator Menti raises and lowers the under lip.

Fig. 1 Fig. 2

Illustration No. 11
Plain Portrait Lighting—Prominences of the Forehead
See Paragraph 205

CHAPTER XII.

Lesson VI.

Modeling the Forehead.

203. By this time you should have learned to properly apply the lead in order to remove blemishes, and also should have a fairly good idea of the general blending as explained in the preceding chapter. Modeling, however, deals with principles differing entirely from blending. Modeling involves the rounding, as well as to some extent shaping, of the features, thus giving softness, overcoming harshness, and at the same time retaining the character of the individual. The character of the subject is shown not alone by the lines and wrinkles of the face, but also by the little prominences or elevations, and by the forms and shapes of the different features.

204. The shape of the forehead is of vital importance in expressing character. The location of the high-lights, which latter were secured by the photographer in making the negative, must be retained, but if the face has been falsely lighted it will be necessary to alter the location of the prominences or high-lights. The forehead denotes the character of the man. Some foreheads are low and receding; some are high and straight, while others are broad.

205. In a front view of the face in Plain Lighting there are usually four prominences or elevations in the forehead (See Illustration No. 11, *a, b, c d*). *A,* being nearest the source of light, is the strongest high-light; *b* comes next in strength, then *c* and *d*. In some faces the lower high-light *b* will be stronger than the upper high-light *a*. In this class of subjects the forehead recedes very abruptly and the light strikes the lower prominences stronger than

the upper ones. Some faces have no such prominences at all. These usually are persons lacking in intellectuality, and in order to strengthen the character in their portrait it is often advisable to build up these four prominences, even if only slightly, so as to represent a stronger character of the individual.

206. The first work on the forehead should be the removal of imperfections in the strongly lighted elevations. In the subjects illustrating this lesson, *a* is this high-light. After removing the blemishes and the most transparent spots, proceed with longer strokes to bring together these imperfections. Then gradually blend and soften the whole high-light. You should work from the highest point on this elevation down into the little half-tone shadows which surround it, and also work back toward the hair, the stroke gradually becoming lighter as you leave the center of the prominence. *Work only half way into the half-tone toward the next highest light, then stop.* Now start to remove the imperfections in high-light *b,* and then blend down from *a,* as far as you worked in *b.* When this is completed carry out the same idea in modeling *c* and *d;* then, with long general strokes, bring all of the work together, but by no means destroy the delicate half-tones which appear between the four high-lights.

207. All of the gradation which is in the negative must be retained. In blending into the shadow and on the edge of the forehead where it merges into the hair, the light ends quite abruptly. Be very careful not to destroy the depth of the shadow; simply soften the edge of the forehead to complete its curve. When you have completed the modeling of the forehead, sit back in your chair and take a general view of what you have done, and if you observe any light patches or mottled effects, build them up and connect them with their relative tones. A few strokes of the pencil may be all that is required to produce a natural, even texture.

208. There should be no abruptness between high-

lights and shadows. With long general strokes you may easily blend such portions.

209. **Irregular High-Lights.**—Sometimes, on account of the shape of the forehead, or because of poor lighting, the high-lights may be broken and irregular. They must be united to strengthen the character and add simplicity and harmony to the general effect.

210. **Producing Texture.**—You must not lose sight of the importance of producing texture or skin effect. The actual grain of the skin of the forehead is most coarse near the center and above the eyebrows. It gradually becomes finer as the forehead recedes backward toward the hair; therefore, in the final work of modeling the stroke should be longest when working on the front of the forehead.

211. **Blending Around the Eyebrows.**—Avoid making any sharp lines on the upper edge of the eyebrow, and, as you approach the brow, do as little work as possible, leaving the original softness which usually exists at these points. By following these principles you will produce proper perspective, retain the roundness, and secure natural modeling.

212. **Wrinkles.**—The character of each individual is such that it affects the frontal muscles that cover the forehead. With age these characteristics become more pronounced and additional minor lines and wrinkles appear correspondingly located on the forehead. Long vertical furrows across the whole front of the forehead are indicative in most cases of *benevolence.* Therefore, it is essential that care be exercised in penciling these wrinkles; the amount of work will depend entirely upon the lighting of the face. If the light comes to a certain extent from the top, heavy shadows will be cast in each wrinkle, exaggerating it. For this reason it is necessary to carefully blend and slightly build up the deep shadows to their normal degree, but by no means should these furrows be removed entirely.

213. The perpendicular wrinkles between the eyebrows above the base of the nose denote *honesty,* and as this is a very valuable attribute to the individual the great-

est of care should be exercised in having them reproduce as near their natural state as possible. In Illustration No. 12 three very important lines are presented. Each, according to its curve, represents a characteristic disposition of the subject.

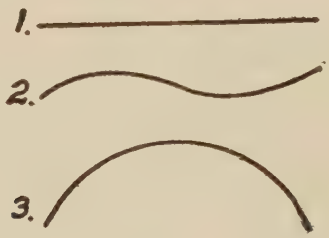

Illustration No. 12
The Importance of Lines—Will, Taste, Feeling
See Paragraph 213

214. **Will.**—Fig. 1. Where straight lines and angles are in the forehead, as well as any of the other features of the face, the individual has a strong will power, and *will* predominates in the mind.

215. **Taste.**—Fig. 2. The more curved the lines of the face the more artistic taste is in the mind, for *taste* runs to curves.

216. **Feeling.**—Fig. 3. When roundness predominates in the face *feeling* predominates in the mind, as *feeling* tends to produce roundness in the features.

217. It is of vital importance that the retoucher observe these three facts, so that he may retain the shape of the lines as much as possible, for to alter them in any way may alter the apparent character of the individual.

218. **Expression.**—The subject of expression will be taken up in a later lesson, yet as a little advance information, it may be said that a pleasing expression is denoted by lines which are turned upward. These lines are most noticeable in the corners of the mouth, which, when curved slightly upward, give a pleasing expression; on the other hand an extremely sober or melancholy expression is denoted by lines pointed downward.

Withdrawn

Character Pointers—Forehead.

219. The broader the head the more *selfishness.*

220. The higher the crown the more *pride.*

221. The fuller the lower part of the forehead the more *practicality.*

222. The fuller the upper part of the forehead and the less of the lower, the more *theory.*

223. The longer the head the more *feeling.*

224. The more square the head the more *thought* and *exactness.*

225. A high and rather square forehead denotes *honesty.*

226. A high crown shows signs of *energy.*

227. The fuller the whole top of head the more *reliability.*

228. The greater the formation, therefore the stronger the high-lights, on the lower forehead, the greater is the *observation* and *practical talent* of the individual.

229. The higher and more pronounced the formation of the forehead the greater is the *thought, reason* and *originality* of the individual.

CHAPTER XIII.

Lesson VII.

Modeling the Forehead.

Practice Work.

230. For this lesson you are expected to work only on the forehead. Try and make the proof of your work appear as near as possible like the figures on the right hand side of Illustration No. 13. You will observe in this illustration that we have four heads, two of a woman and two of a man. One of each of these faces is unretouched, the other has the forehead alone worked as far as we expect you to work in completing this lesson.

231. Before entering upon the practice work of this lesson there are many important details which require careful consideration. For example, the foreheads of children are very smooth and soft, while in the adult, especially men, they become more expressive. The forehead, divided, as it is, into distinct surfaces, portrays prominent features of the character. The wrinkles and lines on the forehead are regulated by the attachment of the skin to the lower part of the forehead. A round forehead is only admissible in the female; in men its appearance is too feminine and lacks strength. The amount of work permitted on this portion of the face depends largely on the age and sex of the subject. If the subject be a woman, the line should be almost entirely eliminated; if an elderly person, the wrinkles and lines may be softened, but by no means entirely removed. The forehead, especially of elderly subjects, should be worked with the utmost care.

232. To be successful, the modeler must work with

feeling, and when working over these character lines and wrinkles, should imagine, not that he is penciling over a smooth surface, but that the high-lights or prominences are actually raised. On such features, he must gradually work lighter, so as not to destroy the character of lines. It is the same with respect to the hollows or deep wrinkles. The worker should feel that he has to get down into the hollows, and, therefore, must work more heavily, filling up and smoothing over—evening up as it were—not entirely eliminating the shadows of the wrinkles, but blending them softly into the remaining portions. In other words, the modeler should imagine that he is working on the actual face of the subject and not merely on a flat presentment.

233. **Texture of the Skin.**—This effect is produced by what we term *stippling*. The grain of the natural skin must be imitated as nearly as possible. In the child this will require very fine stippling. The adult requires a coarser grain and a longer stroke of the pencil. You must be guided entirely by your subject. Do not pencil *across* the grain. Always work *with* the muscles, lines and grain of the flesh. It is a good idea to turn your negative on the retouching desk so that you can continually follow the grain.

234. **How to Produce the Stippling or Grain Effect.**—Some produce a stipple by merely using check marks, others by working in a circular motion, and still others by a cross line. There are still others who work in a zig-zag form, following the lines of the face and crossing them on large blotches and wrinkles. You should employ the method which you think will enable you to produce the required results. One rule must be observed—always follow the muscles, lines and grain of the flesh and no matter what method or stroke you employ, you will produce a stipple. After some practice the hand will guide the pencil exactly right, and you will produce the result and really not know how you accomplished it. Constant practice alone will make you a master of modeling.

235. It is well to turn your pencil quite frequently as the point flattens by constant use. Work very carefully and

Unretouched **Forehead Retouched**

Illustration No. 13
Retouching Examples—Front View—First Stage
See Paragraph 230

Unretouched Forehead Retouched

Illustration No. 14
Retouching Examples—Profile View—First Stage
See Paragraph 238

do not accomplish any more than this lesson calls for (the forehead only).

236. **Retouching the Forehead in Profile Views.**—In a profile view of the face the highest point of light on the forehead will rest almost directly above the temple and you should start to retouch and remove the imperfections at this point. This being the only high-light on the forehead you simply work down into the surrounding shadows and around towards the front of the face, very carefully blending and allowing your touch to become lighter as you gradually work into the shadows and towards the hair.

237. As a rule, there is a certain amount of harshness or abruptness at the hair line. This should be softened, as it adds beauty to the portrait. A harsh outline on the face where the hair begins, always tends to give a very unpleasing portrait. With women subjects, where the hair is slightly curly, the outline may be conveniently softened. The retouching in the forehead should be carried down to the temple only.

238. In Illustration No. 14 we present four views of the forehead, two of which are unretouched, while in the remaining two, only the forehead is worked and completely modeled. Compare your results with these illustrations, which will serve as a guide to follow. After the work on the forehead has been followed, complete proof-prints should be made, to be used for future comparisons. These will serve as an excellent guide, and after you have passed this stage, these proofs should be filed in your proof-file for future reference.

CHAPTER XIV.

Lesson VIII.

Modeling the Cheek.

239. After having completed the modeling of the forehead, proceed to the cheek on the light side of the face. Before attempting to place any strokes on the negative, take a general survey of this feature and notice the location of the high-lights, half-tones and shadows. The outline of the face is determined by the prominence of the cheek-bone. Sometimes this prominence is very marked and objectionable, owing to the strong high-lights which are accentuated by the shadows. The retoucher may be relieved of a considerable amount of work if the photographer has properly lighted his subject and softly illuminated the shadows so there is no harshness between high-lights and shadows.

240. There is a great variety of differently shaped cheeks. Some are round and full; some are angular, hollow, thin and pale; others are soft and flabby. Then there are cheeks having dimples, and those which are mellow in color. The cheeks which present quite a full and round outline, are usually the most pleasing and tend greatly toward beautifying the face. Men's faces, which are usually quite muscular, are, as a rule, more hollow or angular, and, unless the lighting was properly made, will require very careful treatment in retouching, in order to truthfully represent the exact contour of the face. A little shadow may greatly exaggerate slight depressions and make them appear much deeper than they are naturally. If such exist they must be built up lightly, but care should be exercised that

in building up the hollows, you do not overdo the work and produce flatness. A few strokes of the pencil will frequently be all that is required.

241. **Character Expressed by the Cheek—Location of Cheek-Bone.**—Of all the features, the cheek possesses the least number of actual character faculties. The mouth is the most expressive of all the features of the face. Following the mouth we have the eyes, nose, ears, and even the forehead is more expressive in character than the cheek, yet there are points in the latter which should be considered from the character standpoint. A high cheek-bone suggests more of the *animal nature* in the individual; a lower cheek-bone, which gives by far more beauty to the face, denotes *mildness of character* and *a more congenial nature.*

242. Bearing these points in mind proceed to remove the freckles or other imperfections which exist in the highest point of light on the cheek (which usually is on the top of the cheek-bone); then proceed to remove the imperfections that exist on the remainder of the cheek, working up to the base of the nose only on the one side, and down to the ear and jaw-bone on the other. This accomplished, return to the highest point of light and begin with more general and longer strokes to blend and model.

243. **Proper Stroke to Retain Roundness and Grain Effect.**—Remember, that the pores of the skin on the part of the cheek which faces directly toward the camera are much larger in nature than those back toward the ear. Not only is this true, but the openings of these pores are seen on the front of the cheek, while at the side very little of the pores can be seen by the lens; therefore, the longest strokes and the coarsest grain should be on the front of the cheek. As you gradually work toward the nose shorten the stroke; also when working back into the shadow toward the ear the stroke must be shortened until, when reaching the extreme rear of the cheek, the stroke becomes very fine, thus producing a soft delicate grain.

244. In order to note your progress and see the effect of the work produced, proof-prints should be made at va-

rious stages and a careful comparison made between the proofs from the negative unretouched, and the proofs from the work that you are doing on the negative. It is far better for the beginner to apply too little lead to the negative than too much, for the tendency of those inexperienced in the handling of the retouching pencil is to apply too much lead. It is very much easier to add more lead, if required, than to remove an excessive quantity. In the latter case it is necessary to remove all of the work that has been previously done. In working the cheek, do not retouch close to the eyes; in fact, you should simply work up to the lower high-light, leaving this feature until you return to the retouching of the eye proper.

245. The greatest amount of roundness or depth of the face is presented in the cheek; therefore, it is necessary that extreme care be exercised in retaining this roundness, thus giving the proper atmospheric effect. Working in one direction with an even, uniform stroke will tend to destroy the effect of roundness and flatten all of the face. By working with the muscles and lines of the face, the applying of long or short strokes, according to the space you are modeling, will preserve all roundness.

246. Where it is difficult to work crossways of the plate in order to follow the angles, muscles, lines, etc., it is a good plan to turn the plate at a convenient angle. This will also train you to work with more feeling. By following the anatomy of the face you will invariably and unconsciously turn the plate to work around a muscle or to follow a certain line of the cheek or chin, etc. Working in this way you will avoid flatness and the natural anatomy of the face will be retained.

247. **Blending and Connecting Sections of the Face.**—In working toward the temple you will come to the place where you stopped retouching on the forehead. With long general strokes connect the forehead with the cheek so as to unite the work. Gradually blend the forehead and cheek in their proper tonal relations. When connecting one distinct high-light with the next highest light,

such as the high-light of the forehead with the high-light of the cheek, proceed from the highest point of light on the forehead to the temple. Stopping there commence with the highest point of light on the cheek, and work toward the temple. In connecting the two sections, it is best to begin where you left off on the forehead, working toward the retouched cheek. This is preferable to working upward, for in so doing you are liable to apply the lead too heavily and work in steps, while by proceeding downward you have a better chance of gradually blending into the lower tones.

248. **Labial Furrow.**—The line running from the corner of the nose to the corner of the mouth is known as the labial furrow. Work *down into* this furrow, or wrinkle, and not from the bottom up on to the upper lip. Be very careful not to eliminate this furrow entirely. If the face has been lighted with a broad front lighting scarcely any retouching or building up of this furrow will be required. On the other hand, if the lighting comes more from the rear, so that the cheek will cast a heavy shadow into this furrow, it will be necessary to do considerable work in order to properly build up the shadow thus caused. Do not work crossways of this furrow. The stroke should run the longest way, yet by this we do not mean that you should use one long stroke the whole length of the furrow. A number of short, partly curved lines will break up the shadow, and by working the long way of the furrow there will be little danger of your lead going over onto the other portions, building them up equally with this shadow.

249. Where there are many wrinkles on the cheek the larger ones should be lightened, while the smaller ones may be removed entirely. This is a general rule, which is applicable when working on any or all features. (See Illustration No. 15. The two portraits to the left show the forehead and cheek very carefully modeled.)

Forehead and Cheek Retouched

Forehead, Cheek, Lips and Chin Retouched

Illustration No. 15
Retouching Examples—Front View—Second and Third Stages
See Paragraph 249

Forehead and Cheek Retouched

Forehead, Cheek, Lips and Chin Retouched

Illustration No. 16
Retouching Examples—Profile View—Second and Third Stages
See Paragraph 254

CHAPTER XV.

Lesson IX.

Modeling the Cheek.

Practice Work.

250. Having modeled the forehead, your next step will be the modeling of the cheek. The prominence of the cheek-bone determines the outline of the cheek. Sometimes this prominence is very marked and objectionable, owing to the strong high-lights which are accentuated by the shadows. Often certain views of the face will give too much prominence to the cheek-bone. This intrusion upon the beauty of the face is very easily remedied by cutting off the too prominent curve of the bone.

251. The whole cheek can be made round and pleasing and the character still preserved by bringing the shadows up to their proper value with the high-lights. In doing this, less prominence is given the cheek-bone by having the contrast between the high-lights and shadows reduced; therefore, these shadows must be carefully blended with the highest lights.

252. In case of people who lead an out-door life and are exposed more or less to the weather, the cheeks are considerably darkened—tanned—and, therefore, must be retouched on all parts and the various high-lights blended together, otherwise the cheeks may present a hollow, thin appearance. Care must be exercised that you do not overdo the work, thus making the cheek appear puffed and bloated —all likeness being lost. First, it is advisable simply to smooth over the blemishes, and finally, sitting back from your work a trifle and viewing it from a greater distance,

to build up and model the portions which appear sunken, carefully connecting them with the highest lights. You cannot practice too much, as the more you practice the more freely you will be able to manipulate the pencil and, consequently, produce more even results.

253. Having a larger surface to cover on the cheeks than on any other portion of the face, the lead can be applied with a much freer and longer stroke, simply following the lines of the face. It is, therefore, advisable to work for some time on the cheek of your practice-plates, applying the lead lightly, yet effectively. Do not follow any particular stroke, but work promiscuously, only following the lines of the face. Do not intrude on any of the high-lights, but gently blend with them; evening up, as it were.

254. In cases where the HHH lead will not build up shadows sufficiently, try the HH or if necessary the BB, which is softer and gives up lead more freely. Great care must be exercised, however, not to apply this lead too heavily, as too much will adhere; therefore a very light stroke of the pencil must be used. Observe the figures on the left-hand side of Illustration No. 15. These illustrations show the modeling of the forehead and cheek. You will notice that we have softened every harsh line, yet all the likeness has been retained and the forehead and cheek are very nicely modeled. Compare the work that you are doing on your practice-plate with these illustrations, which will serve as your guide. If the result of your efforts is not satisfactory, make a proof from the negative at once, then erase the work by gently rubbing on more of the retouching fluid. At the same time this will prepare the plate for work again.

255. Now, make another attempt and when you have worked the plate to your satisfaction, or as best you can, make another proof and compare this with the former one.

256. It is always best first to fill in and smooth over the blotches and defects in the cheek; then, leaning back from the easel, observe that while you have smoothed over the blemishes, the cheek has quite a thin and sunken ap-

pearance. With light strokes of the pencil you can gradually build up and model the sunken-appearing portions and carefully connect them with the higher lights. In the accompanying illustration observe that the upper subject has a very round face, with no sunken portions. With such subjects the greatest care must be exercised that you do not overwork any particular portion, as very little more than removing the blemishes is necessary. When they are removed a few strokes of the pencil will generally model the cheek completely.

257. **Profile Views.**—When retouching the cheek of a portrait posed in profile, the highest point of light will still be on the cheek-bone, but much more on the side of the cheek and farther back toward the ear, than in the case of the front view. Begin to remove the imperfections on this high-light, working down into the shadows, as previously directed. Then, coming back to the high-light on the cheek-bone, begin to model, working up toward the temple and blending your work with that on the forehead; again, coming back to the high-light, work down toward the jaw-bone, then back toward the rear, and finally blend toward the nose, working up to its base, but not attempting to place any strokes on the nose proper.

258. Where the light on the cheek-bone is quite high, whether in profile or front view, it is, as a rule, advisable to extend this high-light so that it will come lower on the cheek. If the cheek appears hollow, which effect is produced from various causes, the principal one of which is the ruddy color of the cheeks of some individuals, it will be necessary to build up this hollow portion so that it will be perfectly natural, giving an intimate likeness of the individual. Carefully observe Illustrations Nos. 13 and 15, the first views to the left in Illustration No. 13 being from an unretouched negative, while those to the left in No. 15 have both forehead and cheek modeled.

259. In Illustration No. 16 we present a profile view of the face of both subjects. The figures on the left-hand side of the illustration have the forehead and cheek re-

touched as far as we expect you to carry the work of this instruction. Comparing this illustration with Illustration No. 14, showing the face unretouched, you will observe a few fine hairs about the ear in both subjects. They being too conspicuous, a portion of them, at least, should be removed. In the front view, or Illustration No. 15, they are only slightly visible and do not intrude at all.

260. In preparing the work of this lesson, work only as far as the illustrations supplied for this instruction call for, and when you have performed the work to your satisfaction make good proof-prints and file them for your future guidance.

CHAPTER XVI.

Lesson X.

Modeling the Lips and Chin.

261. **The Lips and Mouth.**—The mental temperament indicated by the outline of the mouth and by the elevation and expansion of the corner of the lips in particular, can be very much improved by careful penciling. Mouths which have the corners drawn down give a sort of severe expression; those curved upward are naturally the reverse. There are three distinct shadows on the lips, and each must be preserved in its respective place. No matter from what direction the light comes you will find that the lower lip will have the strongest shadows appear more on the shadow side. The upper lip will throw a shadow on the lower one and this shadow will be darker than either lip, so you must preserve the respective values.

262. The form of the mouth can be materially improved by clearly defining the proportions. Should there exist any cracks in the lips they should be removed entirely. In aged persons the lines of the mouth become lost in the wrinkles at the corners. These wrinkles may be modified. Many times, in order to hold a natural expression of the mouth, the photographer finds it necessary to allow the mouth to be opened, slightly exposing the teeth. *The teeth may be removed from the negative when desirable, by etching and scraping away with the etching knife; instruction for which is given in a more advanced chapter.*

263. The mouth in elderly persons is apt to show wrinkles and depressions. These may be modified, but never should be removed. The modifications can be made quite strong in the lower lip. To allow the corners to droop

would indicate sorrow or ill-temper, so the more you modify them the more pleasing will be the expression; but be always careful to retain the wrinkles.

264. **The Chin.**—Where the chin is small it is well to broaden it slightly by strengthening the lights, building them up a trifle stronger and broader, thus producing a more vigorous personality in the face. In fact, this will add very materially to the general balance in modeling the head without changing the likeness.

265. **Double Chins.**—The double chin applies mostly to aged and fleshy subjects, who are generally provided with an excess of flesh extending from the chin to the neck, and in many persons covering a large portion of the throat. This gives a very displeasing effect. It is not as easy to make alterations in a front view as in a side or profile; however, you can unite the chin with the throat by working away the folds of flesh with the pencil or knife, or by use of both. In *profile views* you can cut away parts that are objectionable and give a very nicely shaped chin.

266. In all well-shaped chins there should be an inward curve above the chin. Should the chin be curved unnaturally, it should be filled in, and if the curve is irregular it must be gradually blended. This is accomplished by penciling and curving the chin inward, working mid-way between the tip of the chin and the lip; then, beginning close to the lip and penciling sufficiently to connect and continue this curve from the lip to the chin.

267. In *front views,* where the chin is almost straight and contains no curve, you should work differently. By placing a slight shadow underneath the lip you can produce this curve. The shadow is made by very carefully scraping the film with the etching knife. This is fully explained in the chapter on *Etching.*

268. **The Dimple.**—If there is a very deep dimple in the chin it should be modified by filling in with lead, but must not be entirely eliminated. Should you completely remove it, the chin would be broadened, giving it a flat appearance.

Character Pointers—Lips and Chin.

269. A well developed chin is a sign of *love.*

270. A square chin is the sign of *honesty.*

271. The thinner the lips the less *affection.*

272. The firmly held lips which do not protrude or point outward show that the individual has *control of his appetite.*

273. Coarse thick lips and a thick chin are indicative of *strong appetite.*

274. A strong square chin is indicative of a *strong heart.*

275. Signs of *selfishness* are expressed in the following:

276. A closely shut mouth, yet thick lips, which do not show the red part to any extent.

277. The projection of the muscle under the lower lip, causing it to look sullen and jealous.

278. A large thick chin, especially one that is thick downward from the corners of the mouth.

279. A heavy coarse lower jaw.

280. A large neck.

CHAPTER XVII.

Lesson XI.

Modeling the Lips and Chin.

Practice Work.

281. Generally in the front view of the face there is a strong high-light on the upper lip on the side nearest the source of light, and in this high-light you should begin to remove the blemishes and imperfections, and then proceed to carefully model this feature. Great care must be exercised not to remove the little furrow in the center of the lip. If the face has been properly lighted with a front or broad light, the modeling which is in this furrow should be retained fully, but if the light comes from the side to a great extent, it will be necessary to blend and slightly build up the shadow which will be formed in this furrow. Remember that you should never work from a shadow up into a high-light. *Always blend and model from the highest point of the curve down into the deepest shadow.* In this way proper roundness will be preserved and perfect modeling secured.

282. Work over onto the shadow side of the face as far as the labial furrow, and on the high-light side of the lip work down into the labial furrow, blending where you left off when retouching the cheek, using long, curved strokes which will produce a looseness and bring all of your work together. The lower lip will require similar treatment. The high-light or high-lights which may be on this feature should be blended carefully and the modeling carried down into the shadows, but do not work up on to the chin. Simply work to the shadow surrounding it. After

this has been accomplished then begin to remove the imperfections in the center of the chin and proceed to model as you have previously done, blending and working down into the deepest shadows, and continuing with the retouching of the neck. When the subject wears a collar it will not be necessary for any special work to be done on the neck, but care must be taken that too much lead is not applied, as the neck is in a much lower key of light than the chin, or even any other part of the light side of the face.

283. **Note.**—The upper and lower figures on the right-hand side of Illustrations Nos. 15 and 16 give a fair idea of the appearance of negatives when the lips and chin have been properly modeled.

284. **Profile View.**—In retouching the profile of the lips the greatest amount of care must be exercised in handling the outline. Follow closely the outline as shown in the negative itself, and do not in any way build it up farther than is necessary to remove the blemishes. In most cases the retouching should begin where you left off on the cheek. All will depend, however, on the location of the highest point of light, for you should begin in the high-light and work into the shadows, if proper modeling is to be secured. The lips and mouth express a great deal of character and should be worked very carefully.

285. Etching is sometimes necessary in order to alter the expression. Instruction on this will be given in a more advanced chapter. Observe the upper and lower figures on the right-hand side of Illustration No. 16. These illustrations will give you an idea of the appearance of lips and chin of profile negatives, when properly modeled.

286. When modeling it is always advisable to begin at the highest point of light, or rather the highest point of a curve. Although this matter has been spoken of a number of times, it is easy for the beginner to forget and proceed to work in a hit or miss manner; therefore, we repeat this direction and cannot too strongly urge you to follow this advice. If this one rule be followed out and always borne in mind, you will seldom experience any diffi-

culty in properly modeling and in retaining character, likeness and atmosphere.

287. **Proofs.**—Proofs should of course be made at each stage of the work, and used in exactly the same manner as in the preceding lessons, for there is no better way of learning the relationship between the negative and the positive, and whether or not the proper amount of work has been applied to the negative, than by making proofs frequently. In printing the proofs be sure that you print them dark enough to tint the highest points of light, as this will show the actual results of your work.

CHAPTER XVIII.

Lesson XII.

Modeling the Nose, Eyebrows and Shadow Cheek.

288. **The nose,** being the most prominent feature of the face requires special care when modeling. Usually it is the dividing line of light, the bridge receiving a strong high-light, extending the full length of the nose. This high-light is strengthened or flattened by the manner in which the light falls on the nose. A strong side lighting will give more prominence to the ridge line. In a broad front lighting it is subdued and may need strengthening to obtain prominence. In many instances this line becomes broader, or somewhat bent, about two-thirds of the way down, and in such cases this break must be straightened and penciled in.

289. As the shape of the high-light depends entirely upon the construction of the nose or the form of the cartilage, the greatest of care must be exercised not to spread the high-lights to any extent. Often it will be necessary to blend around the edge of the high-lights when they are harsh, or end abruptly, as the character of the individual is expressed, to a certain extent, by the shape of the nose; extreme care must be exercised when modeling this feature.

290. In removing the imperfections always begin on the highest point of light, and also begin here when modeling. Blend around the high-lights and then work down on the light side of the nose, leaving the shadow side until you retouch the shadow cheek. Proof prints should be made at each stage and used as a guide. This is important, especially when working on lines and in modeling.

291. In all subjects, the shape of the lines running

from the junction of the nose with the eyebrows determines the length or breadth of the face, and also very materially affects the appearance of the eyes. If these lines are lacking, or if the eyebrows are not well formed, continue the curve in a graceful line, as it naturally should be, and the appearance will be greatly improved. In some subjects the eyebrows are very closely connected. In extreme cases they form almost a straight line across the forehead, which appears very displeasing and should be modified. This you do by penciling away entirely the most objectionable portions, and modeling the remaining parts with a graceful curve.

292. Proof-prints made from the negative before any work has been applied, and numerous proofs made during the progress of your work, will assist you materially in determining when the work has been done right, and the correct amount of modeling has been accomplished. If the lines that run from the nose to the eyebrows are shortened, a thin face will be given a broader appearance, while a very fleshy face may be made to appear longer by lengthening these lines. The length of the nose itself is also changed in this way. Owing to this fact, extreme care must be exercised not to overdo any point sufficiently to change the character or likeness. People like to be flattered, but a complete and unnatural change must, by all means, be avoided.

293. The ridge of the nose must be clearly defined; otherwise the whole of the portrait will be flat and lifeless. Sometimes you will find it necessary to work a high-light on the ridge, in order to give relief to this feature and separate it from the middle tones. This must be done very carefully, as it is an easy matter to overdo the work and spoil the drawing and natural appearance.

294. **Crooked Noses.**—In the case of a crooked nose, if it is large and prominent it will be advisable to cut away the ridge or prominence by etching. Instruction for this work is given in the following lesson on etching. If the nose is small and hollow, then you will need to add on

more high-lights with the pencil—*i. e.*, lengthen and level up, as it were, instead of cutting away. The heavy shadows underneath the nose should be softened by building up a trifle. This will diffuse the abrupt contrast at once and add beauty to the picture.

295. The grooves or lines which divide the nose and cheek are sometimes very harsh and prominent, the depth or harshness of the lines depending on the style of lighting, etc. These lines should be subdued, but never entirely removed. The amount of work permissible on them depends upon the age and sex of the subject. The amount of work required is often so trifling that the greatest of care and judgment must always be exercised, for it is an easy matter to overdo the modeling and destroy character, individuality and roundness (atmosphere).

296. If the subject has a **short stubby nose,** it will be advisable to lengthen the high-light, extending it toward the tip of the nose. This will lengthen its appearance. On the other hand, if the nose is long and really appears exaggerated, the etching knife will have to be applied to the portion of the high-light nearest the tip, thus shortening the high-light, and with it the apparent length of the nose (this will be taken up in the etching lesson). For the present, however, if you desire to shorten the nose you may accomplish it by penciling and removing a trifle of the tip. Be very, very careful, however, in doing this, as you will, in shortening the nose, make it appear broader. To overcome this breadth, you must blend the sides of the lobe in addition to working on the tip, and thus keep the nose in its proper proportion.

297. **Eyes and Eyebrows.**—There is no portion of the face which requires such careful handling as the eye and eyebrows. Very often the eye of the subject gives the whole expression, which is easily ruined by the least overworking of any part. Intelligent handling, however, may often materially improve the expression.

298. For instance, if the eye on the shadow side of the face is not as strong as the eye on the light side—due

to its being thrown in deep shadow—it may be carefully built up; but it must not be made as strong as on the light side, for it is not intended that these portions should be as strongly illuminated. However, slight building up will give a more pleasing effect, and still not change the expression.

299. The upper eyelid and the flesh under the eyebrow often appear too dark and heavy, particulary when the subject has deep sunken eyes. Detail may be worked into this shadow so that it will balance nicely with the high-lights, for, in building up, you reduce the contrast existing between the high-lights and shadows. The same rule also applies to the under eyelid of sunken eyes. All of this work requires but a few light strokes of the pencil, and great care must be exercised that the work is not carried too far.

300. In the case of very full or heavy eyelids, which also give sharper shadows, the same rule must be followed. Even up the lines and shadows and make them blend softly with the highest portions. In some subjects the lower eyelid will droop a trifle at one corner, giving a bad shape to the eye. These lines may be shaped to give a better appearance by penciling the lid in a natural curve to correspond with the shape of the eye. You may require the use of the etching knife to produce shadows; on this you will be instructed in a more advanced chapter.

301. The tear-bags under the eyes are sometimes quite prominent and produce heavy, objectionable lines, which need to be modified. These grow heavier with aged persons, and should be modified accordingly. The perpendicular cross-lines should be entirely eliminated, for by their removal you also give clearness to the lines running parallel with the lower portion of the eye and which are directed toward the corner of the eye.

302. Heavy downward extending shadows under the eyes give a sorrowful expression to the face. These shadows can be removed either entirely or only modified, according to the subject.

303. **Crow's Feet.**—At the outer corner of the eyes in

persons of matured age, as well as in some young individuals, lines running in a fan-like shape will often be found. These lines are usually called "crow's feet," and as they are very characteristic of the individual they should never be entirely eliminated in aged subjects; yet when they exist in young faces it will be necessary, to please the subject, to remove them, or at least modify them considerably, evening up and smoothing them so they will be less prominent. The best rule to follow, however, is to remove those lines which are shorter and less prominent, and merely lighten the stronger and more pronounced ones. Illustration No. 18 shows these crow's feet as they exist in an aged person.

304. **Aged Persons.**—In the negative of the subject for Illustration No. 17 the lines have been modified, yet all likeness is retained, while in the face of Illustration No. 18 the lines have not been modeled at all. The age and features of the subject must, of course be considered when working on these lines, yet in many instances they may be considerably modified, evened and smoothed up so that they will be less pronounced. When these lines are premature, however, they may be removed entirely.

305. The arched form of the eyebrow should, of course, be curved. Any stray or odd hairs, especially those which lead upward, should be removed, but the less penciling done on the eye and eyebrows the better. The beginner should attempt but very little work on this feature.

306. In some instances you will find a subject where the eyebrows meet above the nose. As this is considered very offensive, the eyebrows here must be removed, great care being exercised in shaping and arching the remainder of the eyebrows. The extent to which these operations should be carried depends largely upon the age and sex of the subject.

307. **Frowning.**—Where the eyebrows are lowered, thus throwing a considerable amount of shadow over the space between the eyebrow and the eyelid, as in the case of frowning subjects, a more pleasing expression can be produced by building up and adding illumination or light

to this part, the lead being applied very lightly. False lines and wrinkles will also exist in such cases, and you must eliminate them entirely. Over-hanging eyebrows can also be improved by arching them a trifle, and either cutting off or curving the corners. The penciling out of a few hairs will sometimes have the desired effect. Altering of character will be taken up in a following lesson under that particular heading.

308. If you wish to subdue a smile (the eyelid being raised), you must lower this lid a trifle, thus producing a more serious expression. This you do by penciling and building on a slight extension to the eyelid. In bright expressions the eyelid is very high, leaving a wide open eye; but in cases of calm and sober expressions it will be quite low. When working on such expressions while performing this lesson, attempt to soften the lines only. As a rule, but few strokes will be required, and these, possibly, only light ones. The more pleasing effects are obtained by soft, even blending—no sharp corners or decided lines anywhere.

309. The suggestions above mentioned should be studied very carefully, and whenever these cases present themselves, do as much of the work as can be accomplished with the pencil alone, such as building up high-lights and subduing shadows, etc. The accentuating of shadows and cutting away of objectionable high-lights must be done with the etching knife, instructions for the use of which will be found in the following Chapters on "Etching and Modeling."

310. The eyes sometimes will appear sleepy and dull. This can be remedied by arching the upper lid which will give brightness. Until you have had considerable experience, however, do not try to change the shape of the opening of the lids. You may soften the high-lights by reducing the shadows, but as soon as you attempt any alteration of the shape of the lids you are working on treacherous ground, as the character and expression will change immediately with such alteration.

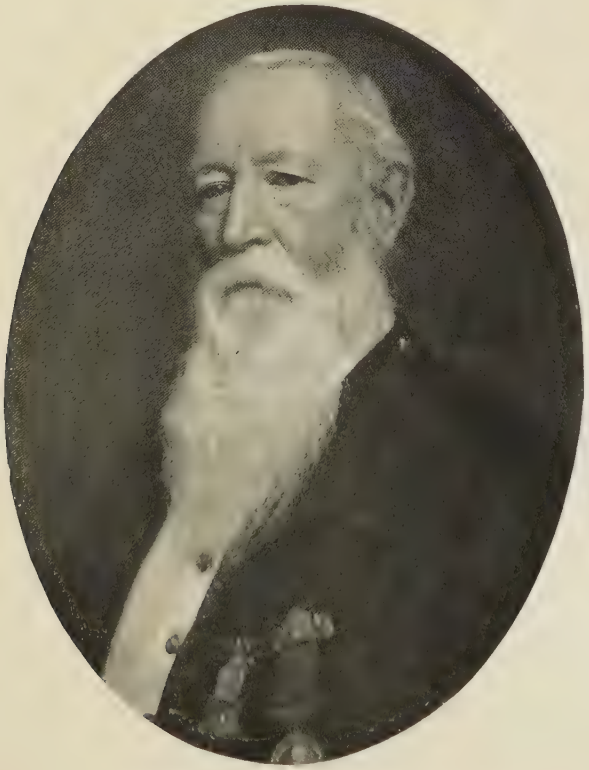

Illustration No. 17
Aged Person Whose Face Required Retouching
See Paragraph 304

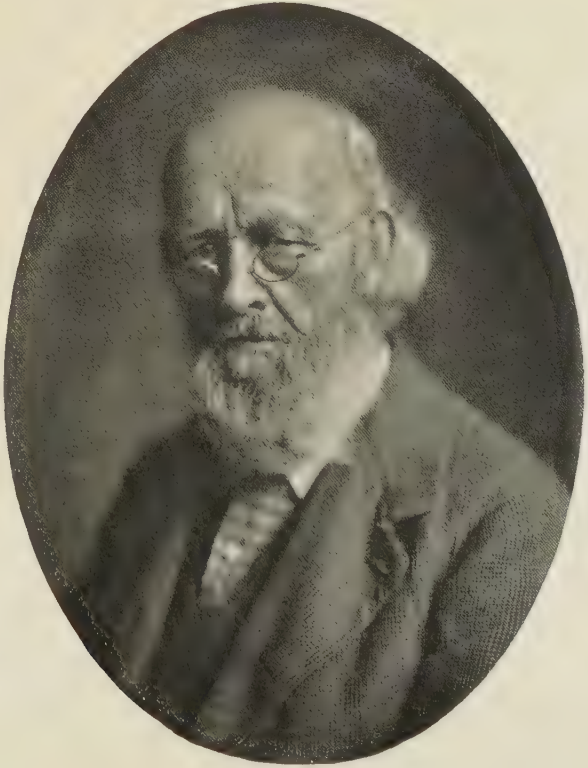

Illustration No. 18
Aged Person Whose Face Did not Need Retouching
See Paragraph 304

Illustration No. 19
Examples of Fully Retouched Negatives—Profile and Front Views
See Paragraph 311

311. The pencil must be kept particularly sharp and pointed when you work on the eyes, and, while the HH lead will generally do the work, you may find it necessary to use a B or BB lead on the heavy shadows. Examine the unretouched print in Illustration No. 13 very carefully, and notice the improvement in the eyes in Illustration No. 19. Before attempting to apply any work at all on the eyes, when practicing on your negatives, be sure that you have good proof-prints from the negatives to use as guides so you may watch each step of the work and see the improvement made.

312. **The Shadow Cheek.**—The shadow cheek should be left until the very last, as it is generally in deepest shadow. After having worked on the high-lights and half-tones, your touch should become much lighter, and you should have good control over your pencil, thus enabling you to control the work on the shadows and very transparent portions of the face.

313. In working the shadow cheek, proceed as on all other features, beginning to remove the imperfections and blemishes in the highest point of light—*i. e.*, the high-light on the cheek-bone. Then continue removing imperfections, working down into the shadows, but be extremely careful in breaking up these blemishes that you do not apply too much lead. Build up the minute and delicate imperfections just enough to match the surrounding tints; then proceed to blend and model, working from the highest point of light on the shadow cheek up to the eye and nose, down to the chin, and finally back on the cheek in deepest shadow.

314. **Practice Work.**—For your practice work proceed with any negative which you have brought up to this stage, and follow the regular method of procedure by first working out all blemishes, freckles, etc. With these removed, whatever blending or modeling is required may be done, as you can then better judge the amount of modeling necessary.

315. Always work first on the highest point of the curve, but the high-lights on the eyelids should not be ac-

centuated or built up, except in extreme cases. The slightest amount of accentuation on these high-lights will, as a rule, alter the expression and make a very vital change in the appearance of the eye. A raised or strongly lighted eyebrow gives the eyeball a deep sunken appearance. Do not touch the eyeball—*i. e.*, the white—the iris or the pupil of the eye. This work should be left until a succeeding lesson, when you have become familiar with the handling of the etching knife.

316. As a rule, the side of the nose which is in shadow will require but little retouching, and great care must be taken in working on this part. In Profile Lighting it is generally advisable to start your work with the high-light on the top of the nose, and then work down to the cheek. When you have completed the modeling of the face, you should take a general view of the whole negative and see whether or not there are any places that will need a little building up or modeling. Usually a few strokes of the pencil will build up any portions that are uneven and need filling in.

317. Remember, all of the work should tend to give a flesh effect, and, when retouching, try to feel that you are working on the skin itself, rather than on the film of the negative. The stroke must be such that the effect will be soft and delicate. After some practice (which alone will make you proficient in retouching) you will gain speed and much of the routine which has been so carefully laid down in these lessons will be eliminated. You will be able to proceed in a perfectly natural manner; your sight and instinct will become so acute that your hand will soon delicately control the pencil, and the work will be accomplished without your giving any considerable amount of thought to it. Do not take it for granted from this statement, however, that you will not at all times have to use judgment, and pay strict attention to what you are doing. This will always be necessary, yet you will gain an innate feeling which will instinctively guide you in your work.

318. Although we have tried to emphasize the neces-

sity of making proof-prints continually as you proceed with your work, we would again urge that you do not neglect this very important part of the work. It is just as necessary for the beginner to make proof-prints as it is that he place the pencil on the negative in order to retouch it. All proofs should carry a memoranda of your methods of procedure, and be carefully filed in your proof-file. These proofs containing notes will always be found not only interesting, but very serviceable to you when working on future negatives, and if you have conscientiously entered into this work your advancement will be very marked with each succeeding negative that you attempt to model.

CHAPTER XIX.

Difficulties—Modeling.

319. **The Forehead Appears Flat After Blending.**—You failed to start your work at the highest point of light, or you have not used a light enough stroke in the delicate half-tones around the high-lights. You have probably built up the half-tones equal to the high-lights. This you must not do. Always begin to work at the highest point of light, and gradually blend and model down into the half-tones or shadows, but following the tone of light as you work from the high-lights. Never work up into a high-light from the shadow, as you will invariably build up the shadows too much and thus flatten the features.

320. **Hard Line Between Forehead and Hair.**—There should be no hard lines at the edge of the forehead, and you should blend into the hair so as to destroy the harsh outline which might exist. It will also be necessary in some negatives to blend a trifle just above the eyebrows. In the majority of cases, however, the flesh near the eyebrows will be soft in appearance and need but very little penciling.

321. **High-Lights Show Too Prominently.**—You have built up the highest point of light itself and not sufficiently blended around it. It is very seldom necessary to do any work in the extreme highest points of light, as these portions usually are strong enough. Only the spots that appear in the high-lights will need to be removed and blended, but no further building up will be necessary. Should you apply too much lead to any spot in the high-light, you would make this portion denser, and it would then be necessary for you to blend around it, and in doing so you would build up the high-light far too strong as compared to the surrounding tint. Only apply sufficient work to retain the values in the negative, and remember that your work is simply to perfect the original modeling and not to destroy it.

322. **Too Much Contrast Between High-Lights and Shadows.**—There should be a gradual blending from the high-lights to the shadows, and there should be no abruptness between them. With long general strokes you may easily blend and connect the various

high-lights with the surrounding shadows. If the lights are broken and irregular, due to the shape of the forehead or because of poor lighting, they must be united. If the shadows appear too dense they may be built up somewhat to a higher tone, which will overcome the contrast.

323. **Flesh Effects.**—If your work does not show a slight grain or flesh effect, your strokes have been made with too much precision. You may have applied too much lead to the negative, or used too short a stroke. Little attention need be paid to the producing of grain, for if you remove the imperfections and blend all portions to their relative tones, you will have secured an excellent flesh effect when your work is completed.

324. **Harsh Line on Upper Edge of Eyebrow.**—This will be caused by your working too close to the eyebrow. There is usually a soft blending of tone on the forehead and you should try to retain this softness in the negative. If you work too close to the eyebrow, and too evenly, you will remove the slight existing fuzziness which produces the original softness. As you approach the brow you should do as little work as possible. Strive to produce proper perspective and retain natural modeling.

325. **Cannot Remove Wrinkles.**—If, after having penciled in the wrinkles, they are still apparent, and you find it impossible to apply any more lead, the difficulty will be due to your having worked so long in one place that it has become glazed over. It will be necessary to flow the plate with the regular retouching varnish to have more lead adhere. When removing deep wrinkles it is advisable to use a softer pencil than you would employ for regular retouching; also try to build up the deep shadows with as few strokes as possible. Remember, wrinkles should not always be removed entirely, as they show the character of the individual. If completely obliterated, the picture would not give a true likeness of the subject. The deeper wrinkles may be slightly modified in strength, while the smaller ones may be removed altogether. Your own judgment, however, should be used in this respect, much depending upon the subject.

326. Women usually require all conspicuous lines removed. Wrinkles and lines in aged people should be retained, but, of course, they may be softened. Where the plate has been worked so that it will not hold any more lead, and the lines are still insufficiently subdued or eliminated, it will be necessary to flow the plate with the regular retouching varnish, in order to be able to apply more lead. This will supply a fresh tooth, permitting of more work being done over the place previously worked.

327. **Forehead in Profile Too Flat.**—The highest point of light on the forehead of a Plain Lighting profile is nearest the camera,

and there should be a shadow on the front of the forehead directly above the nose. If you have retouched and built up this latter portion the forehead will be perfectly flat. Observe in the illustrations for this lesson, that there has been a gradual blending from the highest point of light around toward the front of the face.

328. **Filling in Hollows.**—The greatest difficulty comes from being unable to apply sufficient lead to the plate. You should use a fairly soft pencil and try to apply as much lead as possible at the start. Continually working over and over on the same place glazes over the surface of the film and makes it impossible to apply any more lead. Do not go to the extreme, however, and try to apply too much lead by pressing on too hard with the pencil, as there will be danger of breaking the point of the pencil and thus digging into the film. After some practice you will be able to judge how heavy a stroke to use, and to apply enough lead to match the density around the hollows.

329. **Cheeks Appear Puffed.**—This may be caused by entirely removing the lines under the eyes and those running down from the nose toward the corners of the mouth. If these lines are extremely deep it will be necessary to soften them somewhat, but never remove them entirely. The highest point of light on the cheek should not be built up except in cases of extremely flat lightings. Over-working the cheeks will give them a puffed appearance; building up the half-tones beyond their relative values to the high-lights will result in a puffed cheek appearance. A careful study of the profile illustrations Nos. 14, 16 and 19 will show exactly how the face should be retouched in order to secure proper modeling.

330. **Building Up Bridge of Nose.**—If the bridge of the nose needs building up you will find that the whole lighting has been very flat. By accentuating or slightly building up the high-light on the nose you give more roundness to the face. When building up the high-light on the nose, you work in a straight line as you approach the shadow side, gradually blending into the high-light side of the nose. This will give the bridge of the nose more prominence, and result in more clearly defining the nose itself.

331. Occasionally you will find a slight half-tone between two high-lights on the nose. In other words, the high-lights are broken by a curve or indent in the nose. This may be improved, without affecting the likeness, but care must be taken, when correcting these defects, that you do not destroy the shape of the nose, for, by filling in too much between the two high-lights, you will produce the effect of a flat nose. The direction in which you make your pencil strokes should be the longest way of the nose—*never crossways.* The lines which you use will, in the majority of cases, have

to be almost straight, but use enough of a curve to avoid each individual line showing.

332. **Shortening the Mouth.**—Deep shadows very often will be formed where the lips protrude a little at the corners of the mouth, and give the appearance of an exceptionally long mouth. To do away with this effect and shorten the mouth you will have to fill in the corners, softening down the lines that run from the mouth. It is best to use a medium pencil for this—an HH is usually the best. Take care not to overwork these corners, as to do so will give the ends of the mouth a puffed appearance. Begin the work at the end of the line, gradually working toward the mouth, and as you approach the point where you expect to leave off, blend lightly and work the line somewhat to a point. This gives a neater shape to the mouth.

333. **Modeling the Lips.**—There will be times when the lips have a rough appearance, caused by little natural cracks in the skin, or by their being chapped. These cracks, if from chapped lips, are objectionable and must be removed, as they are unnatural in any subject. In removing them, exercise care that you do not overwork the lines, as that would give the lip a puffed appearance. Each stroke should be made to conform to the cracks in the lips, and the strokes should follow the line of the crack. When the lips contain natural lines, which are not from chapped lips, such lines must *not* be eliminated entirely, but may be somewhat modified. Always work *with* the line, never crossways; rather do too little work than too much.

334. **Preserving Roundness.**—It is by gradation of touch that roundness is produced, and gradation of touch is the secret of modeling. Always begin to work in the highest light, or in the highest point of the curve, and reduce the weight of your stroke as you gradually work down into the shadows. *Endeavor to accomplish your results with as little work as possible.* The least the amount of lead applied the better the results obtained. It is always advisable, for final modeling, to lean back from the easel, taking a general observation of the plate, when the uneven parts may be detected more readily, and when modeling them do so by viewing the face from as great a distance as possible. In this way you have a constant, general observation of the face, and you will naturally apply a longer stroke of the pencil, with the result that more even modeling throughout will be produced.

CHAPTER XX.

Lesson XIII.

Modeling Rembrandt and Shadow Lightings.

335. The general method of procedure in removing blemishes, blending and modeling of Rembrandt Lightings, as well as all Shadow Lightings, is exactly the same as that given in the preceding lessons for the retouching of Plain Lightings. It is important, however, that you begin to work at the highest points of light, or at the highest point of the curve of whatever particular feature you are modeling. This method of procedure is necessary for the beginner, as the stroke is much heavier when starting to work. After having worked on the denser portions, however, better control will be gained of the pencil and a much lighter touch will result. Therefore, you can gradually work down into the shadows and avoid the risk of applying too much lead on the negative. Too heavy a stroke in the shadows would build them up to too high a key and thus flatten the portrait.

336. Always follow a regular system for your work. Begin at the highest point of light, which is usually the forehead, and work downward. After removing the blemishes, in the strongest high-light, carefully blend the edges surrounding them so that this light does not end abruptly where it blends into the shadow. Do not carry this blending too far, however, as it would spread the high-light and flatten this portion of the face. Bear in mind that catch-lights (high-lights) must be round and not flat. To hold them thus, they must be rounded into the shadows and not worked on a level plane; to work on an even plane would give you flatness, which you *must* avoid.

337. Not nearly as much penciling will be required to properly model the shadows as is required for accomplishing the same results in the high-lights; yet for the beginner it is far more difficult to work on the shadow portions, owing to the necessity of using a very light touch, and also because the pencil stroke will show if not applied with extreme care.

338. The modeling around the nose, on Profile Rembrandt Lightings especially, must be done with the greatest of care, as it is a very easy matter to spread the high-light on the ridge of the nose so that it will run over onto the shadow side, thus greatly distorting and broadening this feature. When strengthening the high-light on the nose, or even straightening this member, work your line on the edge of the shadow side of the bridge; not too close to the shadow, but on the ridge, when the face is properly lighted. It is really the shadows you straighten and not the high-lights. Where the high-lights spread over the nose, of course, you build your line at the same point, but the division is not so apparent.

339. The high-light on the cheek must be very carefully modeled. Work from this high-light toward the nose, and then up to the eye, next down to the chin, and last over toward the ear. Very little work will be required on the average chin, yet this feature must not be slighted. After all portions of the face have been blended and modeled, the whole face should be blended—brought together—and this you do with long, general strokes.

340. A proof should be made, of course, before attempting to retouch the negative, in order that you may see in the positive form exactly what work is to be done. Then, when in doubt as to whether your stroke is correct, and whether you are producing the proper results, make another proof of the work you have done and compare with the first one.

341. In Profile and Shadow Lightings the head is generally turned a trifle from the angle of the figure, which is apt to cause wrinkles to be formed in the neck. These

must, of course, be practically eliminated by penciling in the lines, building them up to the surrounding surface. Should there be any strong high-lights on the top of these wrinkles, they will have to be removed with the etching knife. You should not retouch or build up to these high-lights, as this would give a false rendering of the thickness of the neck.

CHAPTER XXI.

Lesson XIV.

Elementary Etching.

342. In etching the negative you perform work the results of which are just the opposite to retouching or penciling; therefore, before attempting to etch it is essential that you be able to retouch the negative.

343. By means of retouching, shadows are built up and transparent blemishes removed. By etching, you reduce the strong high-lights and subdue objectionable parts which are too prominent in these high-lights, and with the etching knife you may also remove objectionable parts entirely. By the combination of etching and retouching—*i. e.*, by the use of the knife and pencil—you etch and model, and with these two instruments you can make any alteration you desire on the negative. High-lights on the bones in the neck may be cut down and subdued; thick necks made thin; excessive drapery removed; crooked noses straightened; shadows accentuated; hair added; backgrounds altered; objectionable portions removed; figures taken from groups, etc.

344. **The Etching Knife.**—It is fully as important to have a proper knife, correctly sharpened, as it is to know how to etch. In fact, the greatest assistance will come from a properly sharpened etching knife. Thin, sharp-pointed etching tools are of little use, although some etchers are able to use them to advantage on certain classes of work. The all-around etching knife is one having a large broad blade, made of the very best quality of steel. The handle of the knife should not be long, for it will often be in the way and hinder you from producing results which require a cer-

tain tilt of the knife blade, which a long handle will not permit of; therefore the smaller and more compact the better. An ideal etching tool will be found in the Schriever Etching Knife, shown in Illustration No. 20. Both edges of the blade are sharpened, one being slightly curved, while the other is practically straight.

345. **Sharpening the Etching Knife.**—The *very finest oil-stone* should be used for sharpening the etching knife. Always wipe the stone very carefully before attempting to use it, for all dust or grit should be removed. The surface of the stone should be perfectly flat. Place a drop of oil on the stone and proceed to sharpen the curved side of the blade first. The blade when properly sharpened should have a somewhat beveled shape—not thin on the edge like a pen-knife or razor. Lay the blade on the stone in such a way as to produce a chisel-shaped edge and draw it forward and backward. Do not move it sideways, as you would when holding a razor or a pocket-knife, but move it lengthways of the blade.

346. While an oil-stone will give you the best results, yet in case of an emergency you may use a piece of *very fine emery cloth,* fastening the cloth to a small block of wood. A few strokes on the emery cloth hone will generally place the blade in good condition for use. If ground too much, however, you will get a wiry edge, which will scratch and not scrape. If you should get a feather edge do not turn the blade over, for you should never touch the opposite side of the blade to the stone or emery cloth; but by pushing the blade away from you the feather edge will be pulled under and, with a few strokes, removed. Do not draw the blade back heavily, for this would again pull the feather edge out, requiring longer time to remove it.

347. After having sharpened one edge proceed to sharpen the other one in like manner. When sharpening the curved edge the knife may be drawn over the stone in a slightly curved motion, so as to give a perfectly even, sharp edge—one which will not scratch.

348. Remember, that the edge of a retouching knife,

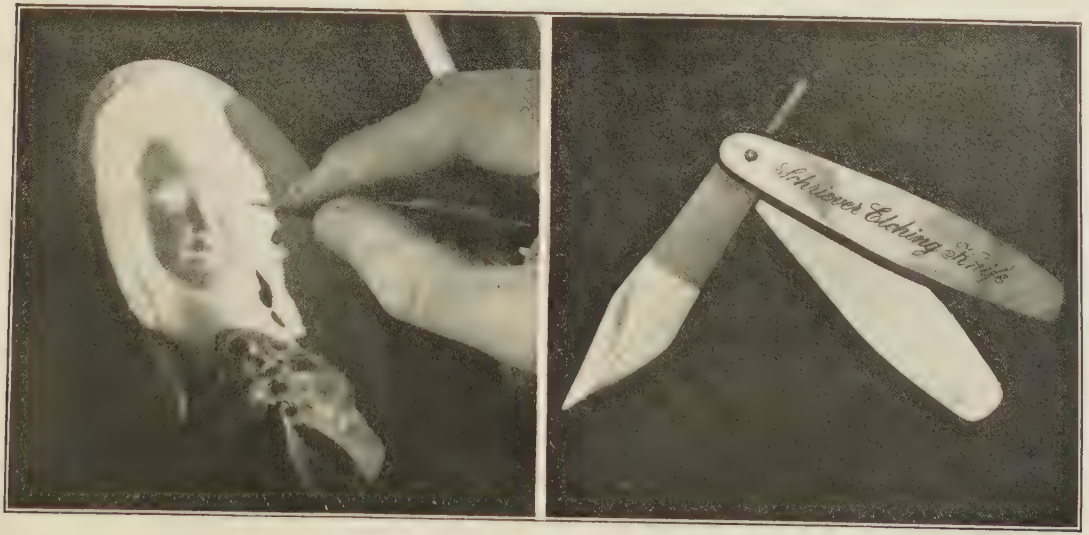

Illustration No. 20
Method of Holding Etching Knife—Schriever Etching Knife
See Paragraph 344

PORTRAIT STUDY

STUDY NO. 5

J. E. MOCK

to give good service must be sharp, and when in that condition is quite delicate. Therefore, it must be most carefully handled and not allowed to come in contact with any hard surface except the film of the negative.

349. **Use of Knife.**—The principal difficulty that beginners will experience is in the proper handling of the etching knife. You use the knife for the same purpose that you use reducing solutions, viz., to reduce high-lights in the negative, only the latter method is a chemical process, the solutions being used to bleach away any objectionable portions. When experienced in the handling of the etching tool much more delicate work can be accomplished than is possible with the reducing solutions. For broad patches, however, you may employ reducing paste very effectively, instruction for the use of which is given in the following lesson.

350. With the etching knife you reduce the high-lights by scraping and shaving down the film until the proper density has been obtained. In Illustration No. 20, page 149, is shown the proper way to hold the etching knife. The blade is held between the thumb and first finger, and should be held almost perpendicularly to the surface of the negative, having practically no slant. If slanted at all the blade should lean toward you, and not away from you. Too much slant to the blade will invariably cause you to cut too deeply. With the blade held perpendicularly you can better control the depth of the scraping. Use the slightly curved side of the blade for blending and for very light work. The straight edge is used for deep scraping and straight line work.

351. A proof should be made of the negative before attempting to etch, and the first strokes should be made very lightly. Do not carry the work quite as far as you deem necessary to fully remove or blend down the objectionable high-light that you are working on. At this stage make another proof, and if the objectionable part has not been sufficiently etched down, go over the work a second time, when you can better judge the exact depth required.

As a rule, the application of the etching knife will cause a slight grain effect which will hold out the light to a certain extent; therefore, in many cases it will be necessary to carry the etching a trifle farther than appears necessary to match the surrounding tint, the grainy effect produced by the etching making this portion a little more opaque than it appears to be when looking through the negative in the retouching frame.

352. Never use the point of the blade for scraping, as it will only scratch and not shave. The point is employed when you desire to etch in single hairs, build up mustaches, straighten lines, etc.

353. **Practice Work.**—Before attempting to etch any portion of a portrait you should provide yourself with a number of discarded negatives, preferably those made with white backgrounds—*i. e.*, negatives in which the background is quite opaque. Select one of these negatives and place it in your retouching easel. Having previously sharpened your etching knife, proceed to scrape or shave the film. Grasping the instrument firmly, hold the blade in a position similar to that shown in Illustration No. 20, page 149, and begin your practice on the background of the plate, scraping the film lightly at the start, and gradually a little heavier. Avoid scratching or digging into the film; merely scrape and shave the surface.

354. Do not attempt to cut through the film with one stroke. *The first few strokes should make practically no perceptible mark,* but with continual application, and after a number of strokes, you should gradually see a change taking place—the film becoming slightly thinner where the knife has been applied to it. By reference to Figs. B and C of Illustration No. 21, you will observe that the different shaped spaces near the shadow cheek are scraped quite evenly and are smooth, while those directly over the head are scratched and not shaved. The latter is caused by digging too deep and not holding the blade properly, which gives a scratched effect, while the others are worked more lightly, giving a smooth result.

Fig. A

Fig. B

Fig. C

Illustration No. 21
Etching Exercises
See Paragraph 35

Illustration No. 22
Etching and Reducing Exercise
See Paragraph 355

355. In Illustration No. 22, you will observe the background of the negative on the high-light side of the subject is etched in patches of different density, from a very light shaving to quite a heavy one. Observe the gradual blend from the light to the heavy shade. This illustration is supplied merely as a guide for your practice work. The work applied to the background of these plates is not intended to improve the appearance of the negative, but merely to show how you must use and control the etcher so that you can shave the film lightly or heavily, and blend as you choose. In other words, the object of this lesson is to instruct you in the proper handling of the etching tool, and when you have once gained control of it you can shave the film as lightly or heavily as you choose, and are then prepared to advance further and apply the knife to the drapery and other portions, as required.

356. Having worked on the background you may attempt a little work at outlining the figure, separating it from the background, as shown in Illustration No. 22. Practice in a general way and apply the principles given in this lesson. One of the most important points to remember is, always to work lightly and not try to remove too much of the film at a single stroke. Continual shaving will produce the desired result. If you observe this caution you will seldom meet with any serious difficulty in removing high-lights, imperfections, etc.

357. Should the knife become dull, draw it over the oil-stone or emery cloth a few times, placing a sharp edge on it again. Successful etching cannot be done unless the etching knife is always kept in good condition. After you have used the curved edge and become accustomed to it, turn the blade over and use the straight edge, attempting to reduce larger areas on the background. The straight edge is seldom employed, except when reducing large spaces, but the practice gained by its use will assist you materially in the handling of the knife and aid you in gaining confidence in yourself when etching with it.

358. In order to see more clearly the effects of the

work you are doing, proof-prints should be made from the portion of the negative you have worked on. Make these proof-prints to a good depth—as deep as you would want a finished print—as this will give you an accurate impression of the final results.

359. As the success of etching depends largely upon the proper handling of the etcher, it is advisable to devote as much time as possible to the practice of shaving the film to different depths. The experience gained will enable you to gauge the amount of scraping necessary by the sense of touch, which will be your future guide.

CHAPTER XXII.

Difficulties—Elementary Etching.

360. **The Object of Etching Patches in the Background.**—The object of etching patches in the background is merely to train you in the proper manipulation of the etcher. By using a plain film surface, such as a plain white background which is quite opaque in the negative, you can see the effects of your work more distinctly; you can readily observe when you are shaving the film lightly or heavily; you have a larger surface upon which to practice blending; and you can also more readily observe when the knife is scratching, or is not working smoothly. In other words, this instruction is prepared merely to give you practice with the manipulating of the etching tool, so that you may learn to control the blade so as to produce any effect of softness or harshness you desire, thus preparing you for the following instruction, in which we deal with the various portions to be etched.

361. **Etching Knife Scratches.**—If the etching knife scratches and does not shave the surface of the film smoothly, the trouble is due to one of two reasons: The knife has not been properly sharpened, or you did not hold it properly when working. The remedy for these is covered in the two following difficulties:

362. **Cannot Properly Sharpen Etching Knife.**—There is but one way to sharpen an etcher in order to secure a perfect edge—one that will shave the surface of the film and not scratch it. To properly sharpen an etcher a very fine oil-stone should be provided, and a drop of oil placed on it. Instead of attempting to sharpen the blade of the etcher as you would an ordinary knife or razor, you proceed more in the manner of sharpening a chisel, applying one edge of the blade only to the stone. Never touch the other side of it. If a circular motion is used to sharpen the blade, apply slight pressure on the blade as you push from you, and no pressure as you draw it toward you. By following this method any feather edge which may be formed will be immediately turned under, and not drawn out, as would be the case if you bear heavily on the knife when drawing it toward you. The first essential consideration for proper etching is a well sharpened etching tool with which to work. Even the most expert retoucher would experience

great difficulty in working with a poorly sharpened knife, while a well sharpened instrument in the hands of the beginner will assist him very materially in its manipulation.

363. **Holding Etching Knife.**—The proper position in which to hold the etcher is that similar to the one employed when using a razor. The blade must be almost perpendicular to the surface of the negative. It is not intended that you should cut the film—you must simply scrape it. By holding the blade almost perpendicular with the film, and drawing the blade toward you, it will shave the film nicely. To tip the top of the blade from you as you draw it toward you will cut the film and not shave it. To lean the top of blade too much toward you will result in scratching the film. The exact angle at which to hold the blade will depend to some extent upon how it is sharpened. After a little experience you will soon detect the right angle at which the blade works best. Bear in mind that the film of the negative is only about $\frac{3}{1000}$ of an inch thick, and that the slightest touch of the knife to it will produce an effect of some kind, even though very minute. A single stroke of the etcher on the film may show no perceptible change, but by repeated strokes a slight thinning away of the density should be visible.

364. **Applying the Etcher to the Exact Place to be Worked.**—It is sometimes difficult, especially with the beginner, to place the knife on the right spot for commencing the work. When beginning the work always tip the blade slightly toward the point and start with the point first, and gradually tip back the blade so as to obtain a wider shaving of the film. By this means you can work very close to the edge of any object you wish to work upon. After a little practice you will find a certain portion of the curve in the blade can be used just as accurately as the point. This can be obtained by practice only, and for your first work it is advisable to start with the point of the blade, and gradually curve back as you proceed with the work.

CHAPTER XXIII.

Lesson XV.

Reducing Paste.

365. While the etcher is indispensable for many purposes, yet a great deal of the work formerly performed with the knife can be accomplished much easier, quicker, and more smoothly with the Schriever Reducing Paste. With this paste you can very nicely reduce white bows in the hair, strong high-lights, and heavy lines in the neck. You can also reduce the drapery or any portion of the background in a most effective manner. Its advantages for working on large surfaces especially are almost unlimited.

366. In order that you may familiarize yourself with the application and use of the reducing paste, and for your first experiment with this reducer, take a discarded plate having a white background—*i. e.*, a negative that is quite opaque in the background. Apply this paste to a portion of the background of the negative in the following way: Dip the tip of your finger into the paste, collect a small quantity on the end of the finger, and then apply to a small portion of the surface, rubbing in a circular motion. You will find that it requires but little pressure to reduce the density of the space to which you have applied the reducer. Begin first by rubbing lightly, and then a little heavier. The heavier you rub the film the more you reduce the density. By means of light or heavy pressure you have absolute control over the blending, and any desired result can be produced. An example of reducing with the paste is shown on the right side of the background in Figs. B and C of Illustration No. 21, also on the left-hand side of Illustration No. 22.

367. The object of applying this work to the background is merely for practice, for on the large surface you can see more clearly the effects of the work produced, and can better judge the amount of pressure to apply to produce certain results. After you have had some practice on the background, and you feel capable of applying the paste to portions which require reducing, select a discarded plate with very strong high-lights in the drapery. Apply the paste carefully to these parts and blend them gradually into the lower tones. After reducing the hard portions of the drapery, and before taking any more of the paste on the finger, try reducing the strong high-lights on the face, using the slight amount of paste remaining on the finger for this purpose. The greatest of care must be exercised in working on the face, and only a very small amount of the reducer employed, for with a minimum amount of reducer and a light pressure of the finger splendid results can be accomplished. With a little practice you can readily apply it with the finger to any parts you wish, excepting sharp lines.

368. For reducing strong high-lights on the neck this paste is also indispensable, and it is advisable to use it in preference to the etcher. The knife should be used only on sharp lines, cords in the neck, accentuating sharp shadows in drapery—in fact any fine lines that cannot be reduced with the paste. Should you attempt to apply the paste to fine lines you are apt to reduce other portions which do not require it.

369. **Applying the Reducer to Small Parts.**—A very convenient way to apply the reducer to small parts and narrow places is to make a stump by covering the tapered end of a piece of soft pine wood, not thicker than a thin lead pencil, with a tuft of cotton. The cotton is attached to the stick by placing a small tuft of the cotton loosely upon the index finger of the left hand, and then with the stick in the right hand place the point of the stick on the very edge of the cotton farthest from you. Gently roll the stick over the cotton toward you, in one direction only, until all the cotton is wound onto the point of the stick; then rolling it

between the three fingers it will become quite solid, and will not come off the stick. The reducer is applied with the stump in exactly the same manner as when using the finger tip, only that the stump works best after it has been in use some little time.

370. If you find it impossible to secure the Schriever Etching Paste, which is the most successful reducing agent of this kind, you may prepare a paste as follows: Take one level teaspoonful of vaseline and mix thoroughly with it three level teaspoonsful of powered pumice-stone. This will give you a paste which will reduce the average lights; but if you desire to reduce extremely opaque portions, you may add more of the pumice-stone. On the other hand, if you wish to work on portions which require but only a slight reduction, then you may use less pumice-stone.

371. The principal secret of reducing with the etching paste lies in the amount of pressure employed. By constant practice you will learn, by sense of touch, the exact amount of work necessary. Therefore, one should devote as much time as possible to the practice of reducing with the paste, as it will prove of wonderful assistance in the modeling of many negatives. This method also saves a vast amount of work with the etching knife, which latter requires more time and considerably more care in its use. Where the applying of the reducer with the tip of the finger is objectionable, one may use a piece of Canton flannel. Gathering one thickness of the cloth about the finger, dip it (in place of the finger) into the reducer and apply it in like manner. Proof-prints should be made from all negatives, before any work is done, and at intervals when working on the plate. You can then very readily observe the results of your work as you proceed. Always file all proofs made of your practice work; they will be of frequent assistance to you.

372. After a liberal amount of practice with the reducing paste, and when you feel confident that you can apply the reducer to any portions desired, then with this experience and the practice you have had with the etching

knife, which should give you full control of the knife, so you can shave the film as lightly or as deeply as required, you are prepared to apply the work to any negative, as needed. For all future lessons you should apply either pencil, reducing paste or the etching knife, whichever is required. In either case always make proof-prints from the negative before applying any of these methods, for you will then have before you the proof of the negative before any work was done, and by making another proof-print afterward you have a very instructive comparison.

373. **Local Reducing with Wood Alcohol.**—The method of reducing with wood alcohol is a very convenient one to employ, and is recommended principally for work on the drapery, reducing white buttons, badges, buckles, objectionable white spots on white drapery, sometimes white ribbons in the hair, also halation around windows, lamps, etc. The method is simple and easily applied.

374. First, procure a piece of soft chamois. If the object or space you desire to reduce is very large, place the chamois over the tip of the first finger, dip it in the alcohol, and start, with a circular motion, to rub over the surface you wish to reduce. Do not rub up and down, nor crossways as that would give streaks, but in a circular motion —first lightly, then, if necessary, a trifle heavier, until the desired reduction is secured. Where small objects are to be reduced, a small tuft of cotton applied to the end of a match may be dipped in alcohol, and the reducing is then done with this stump.

375. The first precaution to be taken in applying the alcohol reducer is to avoid working too heavily, and also to avoid using any sharp tool in applying the alcohol. When the end of a match is used see that the edges are not sharp, and when applying the alcohol to reduce the spot, first work very lightly, and gradually a little heavier, until the proper reduction has been accomplished.

376. When small spots are to be reduced the circular motion is not always practicable, for you must avoid the spreading of the reducer, and, therefore, must not apply

the alcohol to any portions other than those you wish to be reduced. Therefore, this method is recommended principally for medium broad surfaces, and especially for white blotches on dark clothing, and window draperies which have been obscured by the effects of halation.

CHAPTER XXIV.

Lesson XVI.

Practical Use of the Etching Knife.

377. There are times when portions of the face contain strong high-lights and undue prominences, which, if left in the negative, will give a very displeasing appearance. If you attempt to build up to them with the pencil, the face would acquire a puffed or distorted appearance, and the likeness would be destroyed to a greater or less extent. Then, again, there are defective outlines, such as angular jaw-bones, contrasting strongly with a dark background. Again, the head may be turned sufficiently to just show an ear, either on the high-light side of the face or even on the shadow side. In either case the light on the ear may be so strong that it attracts undue attention to this feature. It would be advisable, under such circumstances, to subdue the light on the ear by means of the reducing paste; or, if the subject has been given a slight side view and only a portion of the objectionable ear is shown, then it would be far better to remove the ear altogether than to leave it. In such cases it will be necessary to employ the etching knife to remove the objectionable feature.

378. There are also cases where it becomes necessary to etch hair onto a partially bald head, or to shape eyebrows which may not be so formed as to give a pleasing curve.

379. After diligent practice, as instructed in Lesson XIV, and by applying the work cautiously, you will find no particular difficulty in overcoming these defects, and in

shaping up the face and properly removing any of the objectionable features above mentioned.

380. **Removing Objectionable Portions of Ears.**—Before attempting to work on the negative make a strong proof-print, in order that you may have a positive guide to go by. Having the etching knife perfectly sharp, you proceed first with the highest point of light on the ear, gradually shaving the film, reducing the whole of the ear until you have the tone of this portion so that it matches the tone of the background. With this done make another proof-print, and if the proof shows you have not carried the etching quite far enough, go over the space again, shaving the film to the proper depth. Judgment must be exercised in removing portions of an ear, so that you do not remove parts which should remain.

381. When making negatives of subjects with extremely large ears, the subject may be posed in a low key of light to avoid exposing both ears prominently, and, by turning the face slightly from the source of light, the ear on the shadow side may be removed entirely. In a front view of such a subject, if the whole ear were removed the portrait would be disfigured. When the negatives are made under a strong light, and the ears are abnormally large, the high-lights on the ear may be reduced with reducing paste, after which a portion of the ear may be cut away.

382. Be very careful that your etching knife does not scratch the negative. The blade must simply shave off the film. If it scratches, the work will be sure to show in the finished print.

383. **Shaping Jaw-Bone.**—It will be necessary to shape the outline of the jaw-bone and remove a portion of it in cases where it protrudes and causes an imperfect angular prominence, breaking into the background, and attracting undue attention to its defects. You should determine, first of all, upon the proper shape for the outline. This will be best accomplished by making a proof-print from the negative, and then, with your pencil, outlining the amount of the jaw you judge should be removed. The

pencil outline will give you a positive idea of the appearance of the picture when finished. You may change the pencil lines on the proof-print until you obtain the desired result, and then proceed to alter the negative.

384. By using the curved side of your etching tool near the point (but not the extreme point), and bearing lightly, shave the outline so you will be able to follow it while gradually shaving down the objectionable portion outside of the outline you have drawn. Be sure that your etching knife is perfectly sharp, and then, holding it properly, continue shaving away the high-light until you have reduced it to the same degree of tone as its surroundings. Never carry the etching through the film down to the glass, for if this is done a hard black outline will result at the edge of the face, which no amount of penciling can remedy. The outline of the face should never end abruptly; it must be blended, if only slightly, for no appearance of etching must be noticeable in the finished print.

385. **Adding Hair on Bald Spots.**—With some subjects you will frequently find that the eyebrows are not properly shaped. One eyebrow may be larger than the other; or, if the eyebrows are at all heavy they may be uneven and patchy. Under such circumstances it will be necessary to etch in portions so as to fill the gaps and properly shape them. Often when the hair is thin on semi-bald portions of the head, an undesirable flesh spot will be visible. Hair should be etched on in those portions, to give a pleasing appearance to the portrait, for, if left untouched, these spots will appear very conspicuously, and thus detract from the portrait. When adding on hair or balancing up eyebrows, you can work more with the point of the blade. This will be especially necessary where you want single hairs to show; for only suggestion of hair, the broad part of the blade may be employed.

386. **Removing High-Lights on Hair.**—It very often occurs that the light will be reflected from certain portions of the hair in such a way as to give the appearance of the hair being white. Especially is this true in cases where the

hair has been wet when the negative was made. To remove this apparent defect you may work with a slightly heavier stroke, or, if the hair is quite thin you may even use the point of the etcher, but you must, under all circumstances, follow the wave of the hair; *i. e.*, the knife must be drawn in the same direction as the hair runs, not crossways of the hair. You must also be careful not to carry the etching too deep, as this will give the appearance of jet black hair. This caution must especially be observed when the hair of the subject is quite light. Reduce or shave the film with the etching knife only enough to match the surrounding tones.

387. **Removing High-Light on Under Lip.**—Owing to the shape of the average lip, the outer edge being white, the subject must be properly handled when the negative is made or this member will reproduce very light when contrasted with the red or inner portion of the lip; unless reduced by etching, or otherwise, this would give an exaggerated appearance to the lip. The shaving must be carefully done, and it is advisable, of course, to work the longest way of the high-light; therefore, the stroke of the knife must not, under any circumstance, be apparent in the print, for the grain of the lip runs in the opposite direction from which you are working. Should there be any danger of the stroke of the etcher showing, then it will be necessary for you to work across the high-light. This will not be at all necessary, however, if your knife is properly sharpened.

388. **Removing High-Light on Shadow Side of Mouth.**—As a rule, there is a slight prominence on thin faces at or near the corner of the mouth, which catches the light and throws a deep shadow onto the cheek. This is a false light and must be removed. In the lower left-hand figure of Illustration No. 15, this defect is shown. The figure on the right of the same subject shows this same high-light, which has not been removed by the etcher, but the shadow has been blended up to the high-light by means of the pencil. This gives a swollen appearance to the face and is decidedly displeasing. In Illustration No. 19 this high-light is prop-

erly removed by etching. You will observe that the high-light is only slightly reduced, thus requiring only the faintest shaving with the etcher, and for this purpose, or, in fact, in any case where the blending or reducing required is but slight, the knife must be very sharp—*it must not scratch, but shave smoothly.*

389. **Removing High-Lights on Moles, Etc.**—Moles and other prominences (which in the majority of cases should be removed) almost always have a strong high-light on the tip. This high-light must first be removed with the etcher. It would be impossible to blend up to it with the pencil, for you would distort the face in doing so. After the high-light is removed, and if the mole is quite dark, you can build up the dark portions even with their surroundings, using the regular H lead; if the mole is very dark a BB or very soft pencil will produce the best results.

390. When etching small spots, should you happen, for any reason, to scrape over onto the surrounding tint and reduce that also, a stroke or two of the pencil on the portion which has been unintentionally reduced will build it up to its original tone. The parts which are etched will usually require some penciling afterward, to build up the surface even with the surrounding tones; it is always advisable, therefore, when retouching negatives generally, to do your etching first; then, by doping the plate, the entire surface is prepared to receive the pencil.

391. **Shaping Noses.**—There are many noses which may be falsely lighted, according to their shape. For instance, a pug nose or a nose on which the bridge is not at all pronounced, but is somewhat hollow and flat; the light as it falls upon it exaggerates its breadth to the extreme. The sides of this high-light should be shaved down with the etcher, so as to give the nose its proper width. Noses which are somewhat long, and, when illuminated with a low source of light have the high-light on the extreme tip, may be shortened in appearance by etching away the lower portion of this high-light. There are other cases—

for example where the nose is not perfectly straight—when by removing a portion of the high-light on the side of the nose toward which it curves, and by penciling a new high-light on the opposite side, the nose will be straightened. There are, however, extreme cases which may require etching on the side of the nose and then building up in other parts with the pencil.

392. Aside from these instances there are many other uses for the etching knife in modeling the nose. Almost every negative will require some little alteration of the high-light, in order to perfectly model this feature. Each case will be readily apparent as it presents itself, and by judicious use of the knife and pencil wonderful improvements can be made.

393. Of course you should always make proofs of your negatives before attempting to do any etching, and whenever in doubt as to the progress you are making print another proof, making it sufficiently dark to show clearly just what work you have accomplished.

394. If the blade of your etcher scratches in place of shaves, your knife has not been properly sharpened, or you are not holding it correctly. The edge of the knife must *by no means* scratch the film, for if it does you will experience difficulty and will not be able to secure proper results.

CHAPTER XXV.

Difficulties—Practical Use of Etching Knife.

395. **Etched Portions Show in Print.**—It is often the case that, when high-lights have been reduced with the etcher, the etched portions appear to blend perfectly with their surroundings, when the negative is examined by transmitted light, but show up lighter than their surroundings on a print which is made from the etched negative. This is due to the fact that the shaving of the film produces a ground-glass effect, and although the blending with the surrounding tint on the negative itself may appear perfect, when viewed by transmitted light the grain produced by the scraping of the film will retard the actinic rays which act upon the sensitive paper. Therefore, the shaving or etching of the film should be carried a trifle farther than appears necessary when viewed in the easel by transmitted light. Until you become familiar with the accurate tone required, it is advisable to make proof-prints after working each portion, and if the proof shows the etching has not been carried deep enough, go over the space once more and shave the film a trifle deeper; then make another proof, which should show proper blending. After a little experience in etching you will become able to judge the amount of reducing necessary in order to have the etched portions match with the surrounding tint.

396. **High-Lights too Strong in Proportion to Shadows.**—Whenever high-lights are too strong in proportion to the shadows or half-tones, they should be *reduced*, if only a little, for false modeling would result and flatness be secured if the half-tones were built up to match these over-dense portions. All high-lights should be reduced either with the etching paste, carefully applied, or with the etcher. If this latter method is adopted, you should be very careful to avoid any possibility of scratching.

397. **Etching Outlines.**—Where the outline of the face or figure is angular the objectionable prominences should be subdued, and the outlines rounded so as to give it a pleasing shape. Straight lines and angles are to be avoided. Curved lines are more pleasing, and you should aim to secure such in both the outline of the face and of the figure. In making alterations of this kind, first make a proof-print from the negative; then with your pencil outline the

portions you expect to cut away. It is best to do this on the proof, for if the outlining is not just right the lines can be erased with a rubber eraser and new outlines made. When the outlining of the proof is satisfactory, then proceed with the point of the etcher to outline the portions of the negative film which are to be removed; after outlining, apply the broad part of the blade of the etcher, very carefully scraping the film until the tone matches the background or surrounding tone. Be careful not to carry the etching too far, for although the background may be very dark the film is not absolutely transparent or clear glass. If you carry the etching too far and cut through the film, the part where the film has been removed will print blacker than the background, and you will find it difficult to fill in this spot on the glass. The lead will not adhere to the glass, and if you were to apply color with a brush to these parts you would very likely overdo the work—at any rate, it would be very difficult to blend the surface evenly. Therefore, you should strive never to etch so deep that the film is cut through to the glass. It is better to do too little and go over the work a second time than to etch too deep and ruin the plate entirely.

398. **Etching Paste Will Not Reduce.**—(*a*) If the etching paste will not reduce, the trouble lies in the paste. It must be made from vaseline, and not regular oil. If the latter is employed the pumice-stone will not remain evenly distributed, and there will be times when you will be attempting to reduce a surface with only the oil. The pumice-stone must be uniformly distributed throughout the oil, and it is for this reason that vaseline is the best medium to employ if you make the reducing paste yourself. (*b*) As the reduction is somewhat slow, yet very uniform, you may at first think that the paste is not reducing the density. Continued application, however, will show you that it *is* reducing and producing an extremely even effect. In using the reducing paste, as well as in etching with the knife, you must not expect to reduce the density of a spot to any perceptible degree with one or two rubs or strokes. Only continued application will result in uniform effects.

399. **When Removing Fine Lines the Surrounding Tint is Reduced.**—You should not use the reducing paste for etching away fine lines. In fact, the point of the etcher will be found the most useful for this kind of work. If the reducing paste or the broad part of the knife is employed for erasing fine lines, there will be danger of your reducing portions which should not be touched.

400. **Cannot Reduce Broad Surfaces.**—If you find difficulty in uniformly reducing small areas the trouble will be due to your not having the etcher properly sharpened; or you are trying to etch away too much in one stroke. Uniform reduction is secured only

by careful work, gradually shaving with a perfectly sharp etching knife.

401. **Removing Objectionable Ears.**—The highest point of light should be reduced first, and then the balance of the ear. Of course, only those ears should be removed which give an objectionable outline. In reducing them you substitute in their place the regular background which surrounds the balance of the subject. The outline of the face should be carefully curved and every attempt made to beautify this part of the portrait. Be very careful not to work on the transparent parts of the ear, for they may be already too transparent, and, if such is the case, will require to be built up with the pencil.

402. **Shaping the Jaw.**—The first step in shaping the jaw is to outline it with either the point of the etcher or with the pencil. Having previously made a proof-print from the negative, and, with a pencil, outlined the jaw on the print as you want it, then copy these outlines on the plate with the etcher. Next, very carefully shave away the parts outside of this outline and reduce them sufficiently to produce a perfectly natural background effect. The negative should be proofed when you think you have reduced it sufficiently. Any necessary change should then be made, and the edge of the face very carefully blended so that it will not appear harsh or abrupt. After etching away these parts, some little work with the pencil may be required to even them up nicely; in fact, almost all etched portions require some penciling.

403. **Adding Hair on Bald Spots.**—Where the skin is bare, some hair should be etched on, using the point of the etcher. Do not make the lines too harsh, however. They must be soft, and give every appearance of being perfectly natural hair. A careful study of the hair on other portions of the head will give you an idea of the proper curves and waves, which you must follow to secure the best effects. As with the hair, so also with etching on other portions. You should not strive to produce final results with the first stroke; continued work with the etcher will eventually produce the desired effect. After some practice you will learn exactly how to handle this feature. You cannot expect to secure perfect results at the first attempt.

404. **Removing High-Lights on Hair.**—To remove high-lights on hair the stroke must be made in the same direction as that in which the hair lies. In fact, you should strive to produce the effect of hair in these high-lights, in the reduction of which the point of the etcher will be found the most practicable. This portion of the hair should only be reduced sufficiently to match the tone of the surrounding hairs, for the hair is in the highest key of light and must be kept so.

405. **Removing High-Lights on Under Lip.**—No difficulty should be experienced in reducing the high-light on the under lip, if you follow carefully the instructions given in the lesson. The stroke of the etcher should be made crossways of the lips, and not horizontally. This high-light must be reduced only sufficient to match the surrounding tint. It is a false light and should not be left in a key the least bit higher than the balance of the lip. The point of the blade must *not* be used for this purpose. The film must be shaved gradually so as to blend with the surrounding tones, and this can only be successfully accomplished with the broad part of the blade of the etcher.

406. **Shaping Noses.**—To shape a nose properly you must have an idea of the result desired. Do not attempt to make any alterations before knowing exactly what you want to do. This can best be determined by making proof-prints from the negative. Before applying the etcher outline the nose on the proof, and use this as your guide. Carefully follow the directions given in the lesson, and whenever it is necessary to remove any portion of a high-light, do it with extreme care and proceed slowly, never attempting to secure a completed result with your first efforts. Both the pencil and etcher may need to be employed, but only the most important alterations should be attempted by the beginner. Continual practice and experience will make you more expert and will enable you to procure practically any modification which may be necessary. You should be a careful observer of the appearance of the features in all negatives, especially those which are practically perfect. These will serve well as your models, and if you are enthusiastic and ambitious to produce the best of results, you will cultivate a faculty of observation of all these important considerations.

CHAPTER XXVI.

Lesson XVII.

Modeling Necks, Arms and Hands.

407. In retouching and modeling low necks we have one of the most dreaded and difficult portions of the negative to work upon, for it requires a considerable amount of work and very careful handling on the part of the retoucher, especially when the subject is gowned in evening dress, or, with draped subjects, where the entire neck and portions of the shoulders, arms and bust are shown.

408. Many retouchers have made reputations, not only for themselves, but also for their employers, by the skillful manner in which they eliminate and build up a faulty neck and bust, giving a pleasing appearance to the subject. To accomplish this not only is careful work required, but some little knowledge of anatomy and also a knowledge of handling the etching tool, for the objectionable lines must be given a graceful form and the angles rounded, as well as the high-lights reduced by thinning down. All this can be done perfectly by means of the pencil, etching knife and reducing paste.

409. While many necks and shoulders are thin and have heavy lines, caused by veins, arteries and cords of the neck, yet the majority of these lines are magnified by the turning of the neck to produce some certain pose of the head. Then, too, very few necks are perfectly formed. In cases of square necks the corners should be etched—rounded—with the knife, nicely curving the neck, and the

hollows filled in by a heavy application of the lead. Shoulders are often angular and should be treated in the same way, to secure graceful curves. Referring to Illustration No. 23, you will observe in Figure 1 the appearance of a print from a negative of this type. Notice the imperfections and the contrasty lights and shades on the neck, which are very objectionable. The shoulders, also, are quite angular, the neck appears thin, and the drapery falls a little too low on the arm.

410. The first point to consider must be the outline of the neck and shoulder, and by referring to Figure 1 of Illustration No. 23, you will observe that the shoulders are very much out of balance. In Figure 2 the shoulders have been outlined and the work of reducing the objectionable high-lights begun. It will not do to build up the shoulder on the shadow side equal to the high-light side, but you can curve the straight lines and make the distinction less conspicuous.

411. Before attempting to do any work on the negative, first make a proof-print and do your outlining on the print. When you have this outlined to your satisfaction, then take up the negative and use the proof-print for your guide.

412. The first work upon the negative should be the outlining of the neck and shoulders. With this done, next proceed to reduce the high-lights on the shadow shoulder; following this, you reduce the collar-bone which shows so prominently on the neck. This reducing is done with the reducing paste. As these lights do not generally spread over any great amount of surface, and as their outlines are somewhat sharp, the reducing paste cannot always be applied practically with the finger tip. Either make a stump by winding some cotton on the end of a match or pointed piece of soft pine wood, or else secure a small chamois stump from an art store. The stump will be the more practical and serviceable if you can obtain one; but be very careful that you do not apply the reducing paste or rub the film *outside* of the high-light, for you must not

Illustration No. 23
Subject in Décolleté—Practical Application of the Etching Knife
See Paragraph 410

CHILD PORTRAIT STUDY

Study No. 6

J. E. Mock

reduce the shadows or half-tones surrounding the high-light.

413. The other points of light which are in too high a key will have to be reduced with the etching knife, and the shadows then built up, using a soft pencil, either a B or a BB lead. With these spots reduced to their proper tone, next, with the etching knife, cut away the portions of the shoulder outside of the outline, scraping it away until it matches perfectly with the background. Give a graceful curve to the outlines of both neck and shoulders, and be very careful that no harsh lines exist between the flesh and the background. The edge should be shaved a trifle so as to give a soft blending or rounding away of the flesh In etching, and also in applying the reducing paste, be very careful that you do not reduce portions which do not require it.

414. With the etching accomplished you are now ready to prepare the plate for retouching; so apply the dope in the usual way, covering all the surface you expect to work, including the etched parts. Then proceed in the usual way to retouch the negative, beginning at the forehead, and working downward until you have completed the work.

415. If you have penciled considerably on the negative, so that some portions refuse to take on any more lead, although they have not yet been built up as far as you desire, then flow the negative with the retouching varnish and allow it to dry. The entire surface will again have a fresh tooth, and you can proceed anew with the penciling. Sometimes, in very transparent shadows, in place of varnishing the entire negative it is a good plan to apply a small drop of the dope with the end of a toothpick to the parts you wish to build up further. By rubbing this small space with a circular motion and very lightly, you will get a better tooth, sufficient perhaps, to complete the work. In this case the entire surface should not be rubbed as you would ordinarily apply the dope, for the lighter you rub the surface the more tooth you will have, and as these shadows are sometimes very deep, requiring a great

deal of work, you will want all the tooth you can possibly obtain.

416. Too hard a lead, such as the HH or the HHH, is not at all suitable for work on these portions, as the imperfections would be glazed over before a sufficient amount of the lead had been deposited. For this reason the B or BB pencil is the most serviceable. When the shadows are deep a heavy stroke will do no harm, yet it is best to work only a trifle heavier than usual, and then go over the work a number of times. Heavy application of the lead at first will tend to make the surface of the film slippery, so that you cannot apply as much of the lead as you can by working lightly. Even then you may find it necessary to varnish the entire plate with the negative varnish, giving it a fresh tooth, and working over the varnished surface once more. Full instruction for applying the negative varnish is given in Chapter II.

417. Figure 3 of Illustration No. 23 shows the work of modeling and shaping the neck completed. This negative being quite soft and mellow required but very little penciling after the strong high-lights were reduced. Observe how with a few strokes of the pencil and etcher drapery has been added onto the right arm of the subject. Note the folds in the drapery; they are not straight, but one overlaps the other, some catching the light at one angle, other folds running crossways and underneath the top ones, at a different angle, giving a perfectly natural, soft effect.

418. **Arms.**—The proper handling, or rather modeling, of the arms and hands is very often neglected in retouching. The more general imperfections, blemishes, etc., are always removed, but proper attention is very rarely given to modeling and shaping the arms. If they have been properly lighted the retoucher will have very little work to do, but, it is often the case that the photographer has failed to do his part, and, therefore, it is necessary for you to understand how to properly model these features.

419. The part of the arm nearest to the camera, or the part nearest the source of light, will be most opaque in the

negative. This light, however, should not spread to any degree. There might be a very minute portion in the highest point of the curve that is almost opaque, but from this point there should be a gradual blending around into the shadows. The arm is not flat in any portion and it is essential that the roundness be carried out in the photograph. If the high-lights are too opaque and spread, or have too large an area, it would be advisable to use the reducing paste in preference to the etching knife, as you will be able to secure any results that you wish by its proper application. After having made all the final corrections with the etching knife, then dope the negative and proceed with the penciling, removing any blemishes or imperfections that may exist; next, proceed to model the arm, and strive in every way possible to produce an arm of *flesh* instead of one that appears like marble.

420. Sometimes the wrist is exceptionally large, and looks bad. This may be altered by tapering the wrist, gradually etching off the high-light and slightly rounding it into the shadows. Frequently the curve of the wrist is quite angular; this may be altered by etching off the angular corners, thus giving this member a natural, graceful curve.

421. **Hands.**—Proceed in like manner with the hands as with the arms, etching away or reducing the strong high-lights, and modeling the shape of the hands, as well as the fingers, so that they appear perfectly normal and natural. If, for any reason, the hand has been posed in a somewhat awkward position, it will be necessary to outline it correctly; also outline the fingers, so that there are no hard, abrupt angles. Remember, curved lines are always pleasing, while straight lines and angles are ugly. The veins and lines on the hands of aged people should always be modified; while on the hands of young people, especially women, the lines should be entirely eliminated.

422. The old masters, in painting portraits where the hand was included, always tapered the fingers, as the tapered finger was the sign of culture and good-breeding. To

a certain extent the retoucher may follow out this same idea, thus avoiding a too blunt appearance of the fingers. Do not carry this principle to the extreme, however, for you must remember that it is the aim of photography to reproduce the original with all of its predominating characteristics, at the same time showing the *best* points of the subject. Proper shapes and poses of hands are illustrated in Volume VI, and you will find it very profitable to examine the charts illustrating the lesson on posing the hands, in this particular volume.

423. **Practice Work.**—For your practice work you should provide yourself with some negatives similar to the ones from which the prints in Illustration No. 13 were made. If you have none on hand, but you have the facilities, it is advisable to make a number of such negatives specially for this purpose. When you have no studio or no means of obtaining negatives, cast-off negatives, which will answer every purpose, may be secured from some studio.

424. Before attempting any work upon a negative, make a proof-print from the negative and pencil the outline on the print. Use this print as your guide. Begin the work of etching by first outlining the parts to be etched; then, as you proceed with the work make more proofs, so that you may have an accurate proof of the amount of work you are doing on the negative and the effect of the etching and penciling. If there were any special methods which you employed while etching or penciling, any special grade of pencil, etc., record all this data on the back of the final proof or of the intermediate proofs. File all of these, so that you may have a record of the work you have done. At any time in the future if you are working with a similar subject, you will be able to refer back to these proofs and learn exactly the manner in which you proceeded to secure the results.

425. The subject which we have used in illustrating this lesson is an average example of commercial work, but there are many shapes, as well as many different positions, in which the subject may be posed, making the application

of the etching and retouching somewhat different in each case. The principles, however, are exactly the same as those laid down in the lessons, and you must use your judgment in outlining the neck, remembering that there should be no angles or straight lines. Graceful curves always add beauty to the portrait, but do not carry your work to the extreme, and thus attempt to gain beauty at the expense of character or likeness of the individual.

Illustration No. 24
Subject in Décolleté—Reproduction from Negatives before Etching
See Paragraph 427

Fig. 1 Fig. 2

Illustration No. 25
Subject in Décolleté—First Stage—Preliminary Etching
See Paragraph 428

CHAPTER XXVII.

Lesson XVIII.

Advanced Modeling of Low-Neck Subjects.

426. For the illustrations used in this chapter we have selected a front, also a profile, view of a pretty subject, possessing good lines and a good figure, but for special use in this instruction the lightings and positions given are such that the lines appear quite angular. The cords of the neck are strained, giving the appearance of a very thin neck, which will require a considerable amount of work to build it up to its proper form. All this can be done, however, without any change of the likeness whatever.

427. In Illustration No. 24, Figs. 1 and 2, we present an unretouched reproduction from the negatives. In proceeding with the retouching and modeling of these negatives, we begin by doing whatever etching is necessary. Owing to the straight lines (cords of the neck) the reducing paste cannot be used, and the etching knife must be employed. The high-lights on the cords of the neck are first shaved down, bringing them down in strength equal to the tones to which the neck is to be built up. With this accomplished, we next observe that the lines of the neck are quite angular, especially on the shadow side of the face. The straight lines must, therefore, be slightly curved at the shoulders, and the background, being white, the curving is done by scraping the film with the etcher, reducing the density of the tone of the neck. With this done, then, with the etching knife, build on a little more to the shadow shoulder. This you do by scraping the background to the depth of the shadow in the cheek, curving gracefully and nicely joining the shoulder and neck.

428. Illustration No. 25, Figs. 1 and 2 show the results of the etching knife. It would be advisable for the student, until he becomes proficient, to first make proof-prints from his negative before any work is applied to the plate. By having these prints before him he will have at all times a comparison for his results.

429. With the first etching all done, the plate is next prepared for retouching by applying the retouching dope over the entire surface of the face and neck, and then, beginning at the highest point of light, which would be the forehead, start retouching and modeling—the face first—frequently comparing your work produced with the proof made from the negative before retouching.

430. In Fig. No. 1 you will observe the subject is very round-faced, with no sunken portions, thus requiring only a minimum amount of work to be applied. To avoid overworking any particular portion, you should do very little more than remove the blemishes, for when they are removed a few long strokes of the pencil models the cheek perfectly.

431. On the profile view, Illustration No. 25, Fig. 2, you will observe a few scattering fine hairs above the ear. As they are quite conspicuous we have removed them, as will be seen in Illustration No. 26, Fig. 2. In the front view, Illustration No. 25, Fig. 1, these hairs are only slightly visible and do not intrude whatever. Observe the left jaw in the front view, on the high-light side. It appears quite square, and, therefore, should be curved. This we did by penciling with a soft BB lead. The line running alongside of the nose in both profile and front views, as you will observe, is quite strong, and we therefore toned it down, subduing it, but not entirely eliminating it. This was done by penciling with the line of shadow, using a BB lead. When working negatives of this kind it is advisable to make proof-prints at this stage of the work, before proceeding further, that you may have proofs of the work already done for comparison.

432. **Modeling the Eye and Eyebrows.**—The next

Fig. 1 Fig. 2

Illustration No. 26
Subject in Décolleté—Second Stage—Etching and Retouching
See Paragraph 431

Illustration No. 27
Subject in Décolleté—Etching, Retouching and Modeling Completed
See Paragraph 440

stage of the work is the modeling of the eyes, and then the eyebrows. Observe the appearance of these members in Illustration No. 25 of the unretouched plates. Note the improvement on them in Illustration No. 26. You will observe in the front view of the subject, that the left eye appears a trifle smaller than the right. The dark line between the eyelash and the eyebrow droops over the center of the eye. The fleshy portion beneath the left eyebrow is so large that it crowds the eyelid upon the eye, thereby closing it slightly. To correct this defect, with the point of the etching knife we carefully scraped away a small portion of the fleshy part above this line, curving it gracefully, and then, with a BB pencil, we raised the high-light a trifle on the eyelid sufficiently to match the right eye. We also raised the eyelid from the pupil, by scraping away a trifle of the eyelid, slightly arching it over the pupil.

433. You will observe in Illustration No. 25 that the line above the eyelid is wider at the outer edge than it should be to appear graceful. This we have reduced, as shown in Illustration No. 26, by slightly penciling the under side of the line. Next in order, we take up the dark shadows under the eyes. These lines, especially in women's pictures, are very displeasing, and should be modified considerably. In aged subjects they may be modified slightly, but must never be entirely removed. The modifying of these lines was done with an H lead. The catch-light, or white speck, in the left eye, as you will notice, is quite dull and needs strengthening a trifle. This we did with the point of a BB lead. Note the improvement which is presented in Illustration No. 26.

434. The eyebrow of the front view in Illustration No. 25, you will observe, droops on the end and is not perfectly arched. The addition of a few hairs, added with the etcher, (see Illustration No. 26), improves this member very materially.

435. In the profile view of No. 25 (unretouched), the eyelid droops slightly, thus giving the subject a dreamy appearance. This we corrected by merely straightening the

line over the pupil, penciling slightly, and then we subdued the shadows underneath the eye, thus giving roundness. (See Illustration No. 26, Fig. 2.) The eyes being turned from the light there would be no catch-light or white spot in the pupil; consequently, no work is required here. When the eyes are turned into the light, or where the light crosses the pupil, it supplies a catch-light, and this catch-light should be curved.

436. **Nose, Lips and Chin.**—We next proceed to the nose, then to the lips, and finally to the chin. You will observe in Illustration No. 25, front view of the subject, the nose appears very square and block-shaped. Compare this figure with Illustration No. 26 and you will readily see the improvement made. The modeling of the nose may be accomplished by building up the high-light side one point higher, or by reducing the shadow side one point lower. The former is done with an HH lead, while the latter is accomplished by scraping away a trifle of the film on the shadow side of the high-light with the etching knife, thereby narrowing the bridge of the nose. In this particular case the high-light was strengthened and the nose straightened by penciling in a straight line along the bridge.

437. In the profile view, Illustration No. 25, the nose appears to have a little hump about the center of the bridge. This will appear much better when straightened, as will be seen in Illustration No. 26. We straightened the bridge of the nose by scraping off the little hump with the etching knife. The lower lip in both front and profile views appears quite set. The lip does not project over the chin, nor does the space between the lip and chin recede a particle. There should be an inward curve above the chin, to give it good lines. Observe that the chin in this subject forms almost a straight line with the lower lip. The recess, or curve, as shown in Illustration No. 26—the front view—is produced by shaving or scraping a slight shadow underneath the lower lip with the etcher; also slightly outlining the edge of the lower lip. This latter you do with the point of the etching knife, making a faint line only.

438. The profile view of the face, being turned into the shadow, shows the chin in shade; therefore the curve in the chin is supplied with the pencil. By first outlining the curve about midway between the tip of the chin and lip, then coming close to the lip, we penciled away sufficient to connect and continue this curve gradually from lip to chin.

439. **Modeling the Neck.**—The modeling and blending of the neck is a simple matter when the etching has been all done. As you have a broad surface to work upon, long strokes of the pencil may be employed, using the soft lead where the shadows are quite deep. The shadow shoulder in both illustrations being quite dense, the BB lead was employed for building them up a trifle. To blend these shadows gradually with the higher lights, a great deal more lead was necessary than ordinarily; consequently, after applying all the lead possible, and all that the retouching dope would supply tooth for, the entire negative was flowed with negative varnish and the retouching of the shadows concluded by working on the varnish, which latter supplied ample tooth for the completion of the work.

440. By comparing Illustration No. 27, Figs. 1 and 2, with Illustration No. 24, Figs. 1 and 2, you will observe that while all lines are modified and all angles removed in Illustration No. 27, yet the likeness of the subject has not been altered in any way.

CHAPTER XXVIII.

Lesson XIX.

Etching and Altering Draperies and Figures.

441. It is almost always necessary to alter the drapery to some extent in the average portrait negative. No matter how careful the drapery may have been handled by the photographer, some little fold may be out of place, or, perhaps, may have caught too strong a light. This latter difficulty occurs especially in the case of light draperies. In cases where men's coats are not freshly pressed, wrinkles may occur which will have to be straightened out. Both pencil and etcher will come into play and you should know how and where to apply these, to produce the best effect.

442. Folds and wrinkles in ladies' dresses can be removed by carefully working the shadows with a soft lead. This can also be done on men's coats and trousers. The crease in the trousers may be straightened by working a straight line with the pencil, and removing the crooked parts with the etching knife.

443. **Strengthening Catch-Lights on Drapery.**—Ladies' waists and gowns, if white, can be improved by skillful manipulation of the pencil. In the case of chiffon trimmings or draperies a slight intensification of the high-lights with the pencil will add to the detail and brilliancy. Frequently an entire gown can be improved by penciling the catch-lights throughout. A BB pencil will be found most suitable for all this kind of work. The penciling must be done very carefully, otherwise it will appear harsh and too bold. In cases of plain satin you may outline the entire gown following the high-lights on the folds with a BB pencil, and strengthening them. By doing this you supply catch-

lights and accentuate the shadows by reason of the greater amount of contrast thus formed.

444. Be very careful not to apply the lead too heavily. Work on the high-light side of the fold only, for if the lead be allowed to touch any other part, the effect will be ruined. The folds of the drapery which are in shadow must be treated very carefully and, if any lead is applied to them, you should use only enough to accentuate the catch-lights and give them the same relative strength as the highest lights in the picture.

445. **Ladies' Gowns.**—In all gowns having the same colored lace trimmings, more contrast can be obtained in the lace by tracing over the design with a soft (BB) lead, working in catch-lights where they will improve the effect. With the etching knife scrape the film slightly in the openings of the design on the shadow side only, thus accentuating them. To scrape the film or accentuate the shadows too much will give harsh effects, so work lightly and carefully. When working on dark draperies or when a gown is trimmed with dark-colored lace, a harder pencil, such as an HH, may prove best suited for the work, as there will be less danger of getting the high-lights too strong.

446. **Black Gowns.**—As the high-lights are soft and the shadows velvety in black gowns, the greatest care must be exercised in attempting to make alterations or to accentuate these high-lights or shadows. The high-lights must be made broader than is required for light gowns. The shadows in the folds can be accentuated by carefully scraping the film, but this is seldom necessary, and by no means advisable if the proper amount of contrast can be secured by building up the high-lights.

447. **Draperies.**—When soft goods, such as chiffon, etc., are used for draping the figure, the material, being so soft, the folds are not very conspicuous. A little work on the folds with a BB pencil will supply both high-lights and catch-lights, thereby accentuating the shadows. If this does not give the desired effect, the shadows may be still further accentuated by scraping in slightly with the etching

knife or by using the reducing paste, the latter being applied with the stump.

448. Before applying the etching knife or pencil make a deep proof from the negative and use this as your guide. You can then more readily tell how much to accentuate or reduce. Whenever in doubt as to the effect produced, make another proof-print and compare with the first. These proofs should always be filed for future reference.

449. **Outlining the Figure.**—There are many cases where the portrait, and especially the three-quarter length, of a fleshy person may be greatly improved by removing a portion of the outline of the figure. Often the photographer, either through carelessness or lack of knowledge of proper posing, will place a stout person so that the body faces almost directly front, and this really exaggerates the size of the individual. Even when correctly posed to diminish the effect of stoutness, most pictures of stout people are improved by cutting down or reducing the figure. In Fig. 1, of Illustration No. 28, is presented a picture of a stout subject and although correctly posed, the appearance is yet too stout and should be very materially reduced. Fig. 2 shows that the outlining was first done with the etcher on the white waist and the pencil on the dark skirt. The next step was to etch away the waist outside of the outline and to pencil in the skirt to match with the background. The final result is illustrated in Fig. 3 of this illustration.

450. The principal considerations for reducing figures are: Follow the lines of the figure and produce graceful curves. There is plenty of opportunity to exaggerate to the extreme and, in doing so, to ruin the picture entirely. It is better to cut away too little than too much, yet stout persons usually are better satisfied when they are made to appear more normal and the judicious use of the etcher will therefore often make a much more pleasing picture.

451. **Adding Drapery.**—One of the most difficult tasks performed with the etching knife is the constructing or adding of drapery to a figure. There are times when one may have a satisfactory likeness of the face, but the picture

is condemned on account of the subject being gowned in décolleté and thus unsatisfactory in this respect. With drapery added to such a negative the picture would perhaps be entirely satisfactory. While the making of these changes requires some time, yet any results may be produced by proper care and with the use of the etching knife and pencil.

452. **Altering Drapery and Adding on Regular Waist.** —In Fig. 1, of Illustration No. 29, is shown a portion of a portrait of a lady posed in an evening gown. We demonstrate in this illustration the altering of the drapery and the adding of a regular waist. To accomplish such results a drawing should first be made on tissue-paper, of the kind of waist to be added. A suitable design or pattern may be obtained from any of the fashion journals or magazines. If skillful with the pencil, a pattern of one's own design may be constructed, yet much more accurate results will be obtained if some suitable printed pattern is followed.

453. In order to accurately outline the design to suit the subject, place a piece of transparent tissue-paper on the glass side of the negative, and fasten the edges of the tissue to the negative with gum stickers, so that it will be immovable; then with a pencil sketch your design on the tissue, following the pattern you have selected. With this accomplished turn over the negative, film side toward you; then, with the etcher, very lightly trace the outline of the design on the film of the negative, as shown in Fig. 2. Now, remove the tissue-paper pattern, and with the etching knife begin to blend and construct the shadow portions of the drapery, carefully following the original design.

454. You will observe in Fig. 2 that the locket is not well placed, being very much to one side. To locate it properly a new locket must be etched on, as is shown in Fig. 3. Allow the old one to remain until you come to the final finishing, when it is eliminated with a soft BB lead. It is advisable to outline the locket on the film first with the pencil, which will give you an idea of the design before using the etcher. With this completed and without working

Fig. 1

Fig. 2

Fig. 3

Illustration No. 28
Reducing Size of Stout Subjects
See Paragraph 449

Illustration No. 29
Adding Drapery to Subject in Décolleté
See Paragraph 452

in any high-lights, we have reached the third stage. (See Fig. 3.)

455. The final touches must now be placed on your work. Contrasted portions must be softened and flat portions strengthened, and the figure or design of the lace, etc., built on. To accomplish this, the film on the shoulders is shaved down with the etching blade, reducing the high-lights to a more mellow and soft tone, after which the pattern of the lace and folds of the drapery are built on with a soft BB pencil. At the same time the first locket is also erased with the pencil, the straps of braid are strengthened, and the edges dotted on, the whole effect worked up so as to give all the appearance of a perfectly natural portrait made when the subject was dressed with a waist and high collar, or whatever the design may be which you have chosen. (See Fig. 4.)

456. You will observe by comparing Fig. 4 with that of Fig. 1, that the gown appears perfectly natural and entirely devoid of any mechanical work.

457. **Altering Men's Clothing—Shaping and Outlining Figure.**—There are times also with men's clothing when considerable alterations are required, such as smoothing out wrinkles or folds in the coat, straightening shoulders, subduing the glitter on buttons, balancing the lapels of coats or vests, removing pocket-handkerchiefs, changing neckties, or even adding on collars. All these and seemingly more difficult things present themselves in the course of one's career, and they are quite easily accomplished if you proceed in the proper manner.

458. In order to demonstrate some of the most common corrections which one is called upon to make, we supply Figs. 1, 2 and 3 of Illustration No. 30. By referring to this illustration you will see in Fig. 1 that the lapels of the coat, also those of the vest, need attention; the shoulders need balancing; the glitter on the buttons need subduing; the shirt requires a collar and tie. With these corrections the picture appears quite presentable.

459. In making these alterations we begin first by straightening the shoulders. By reference to Fig. 1 of this

illustration you will observe that one shoulder is much lower than the other; therefore it is necessary to remove a portion of the outline of the left shoulder, which is the higher, and to build onto the right shoulder, which is somewhat lower. By referring to Fig. 2 you will observe we began by first outlining both shoulders with the pencil, working very lightly to give us the proper proportions.

460. **Removing Wrinkles—Etching on Collar and Necktie.**—We next proceeded to straighten the collar of the vest which, you will note in Fig. 1 is wrinkled and twisted, while in Fig. 2 we have etched a straight line over the wrinkle, thus straightening it, yet leaving it in an unfinished state. We have also outlined the collar by means of the pencil. We have raised the collar as high as we desire it by drawing a line. This line with the pencil on the negative, of course, reproduces white in the positive.

461. In order to outline the collar we made use of the etching knife, which you will observe in Fig. 2 gives a crude outline of this object. With this complete the outlining is done.

462. We next proceed to modeling our subject, beginning with the balancing of the shoulders. First, we selected the left shoulder, which, being black, required the use of a pencil to cut it away. For this purpose we used a soft BB lead, following the outline previously made with a pencil, working close to this line. With this accomplished the right shoulder required an addition, which was made by etching away the background to the outskirts of the line previously drawn, eliminating this line entirely. With these two methods we have now balanced the shoulders.

463. Next we directed our attention to the building on of the collar. The outlining, as you will observe in Fig. 2, has been done principally with a pencil, and as the collar is white and the flesh dark, we built the collar up to the white outline with a BB or soft pencil. Then, by means of the etching knife, we supplied a shadow between the laps of the collar, which gave us depth, and, in order to make the collar stand out from the shirt more promi-

Fig. 1 Fig. 2 Fig. 3

Illustration No. 30
Practical Commercial Etching
See Paragraph 458

PORTRAIT STUDY

Study No. 7

John H. Garo

nently, we etched a slight shadow underneath the collar. This was done with the point of the etching knife, and the point was also used in etching on the small necktie. For all commercial purposes we would advise the etching in of a larger necktie, but in order to demonstrate more clearly the method of procedure, and not to cover up any more of the outlining than was absolutely necessary, we have added only a very narrow necktie, which you can readily see can be easily modified and enlarged.

464. Following this work we next proceeded to reduce the high-light on the vest button, which, in Fig. 2, appears very conspicuously. This was subdued with the etching knife. The wrinkle in the vest was straightened by shaving the film, filling in the space and blending the wrinkle with the natural tone of the goods.

465. With the etching now practically complete, we next proceed to blend the work done with the pencil and etching knife. As the remainder of the work requires principally the applying of lead, we prepare the plate with the retouching dope, and proceed to the blending of the altered portions. Usually the portions that are etched are not sufficiently smooth to give an even blending; consequently these portions are gone over with the retouching pencil. This is especially necessary to produce roundness, as you will observe in the shoulders, for instance. By penciling over the sharp edge of the work done with the etching knife, you produce roundness to the shoulder and give it a more natural appearance.

466. The sharp edges of the collar, which were etched with the point of the etching knife, would appear quite abrupt unless slightly softened with the lead pencil, and these have been gone over with an H lead, while the space in the opening of the collar has been worked with a soft lead, or the BB.

467. This concludes the blending of the alterations made, and we now proceed to retouching the face, and as usual begin with the work on the forehead. You will observe, by reference to Fig. 2, a few stray locks of hair

falling over the forehead, which are unnatural and appear careless. These are removed with a BB lead.

468. **Shortening the Length of the Nose.**—You will also observe in Fig. 2, that the nose appears quite long, and we have shortened this feature by etching away a portion of the high-light at the tip of the nose. This is an important alteration, and unless carefully done will often spoil the likeness.

469. In Fig. 1 you will observe that the length of the nose has been exaggerated by the manner in which the high-light has been extended on the bridge of the nose; and also by the camera being placed above the subject, looking down upon the bridge, thereby lengthening it, while had the camera been placed on a lower plane the nose would have appeared shorter.

470. Shortening the bridge of the nose has not changed the likeness of the individual at all; in fact, as shown in Fig. 3 the nose is far more natural in appearance than in Fig. 1. By comparing Fig. 1 with Fig. 3, as a whole, you will note the likeness has been preserved throughout. The changes made have wonderfully improved the appearance of the subject, and out of a practically speaking worthless portrait has been produced a very pleasing picture.

471. A careful comparison should be made of these three figures, as many important points have been covered, and by careful study of these and preceding ones illustrated in this volume there should be no great difficulty experienced in making any necessary alterations. Before making alterations on any negative, however, you should decide upon the exact effect you desire to produce, or the changes you wish to make. Never start to retouch or etch a negative before you have formulated your ideas as to what is to be done. Do not work in a haphazard way, but always follow a certain system. The methods given herein, if followed to the letter, cannot fail to lead you to success.

CHAPTER XXIX.

Lesson XX.

Hats, Ribbons and Hair.

472. Each portion of the picture space should be given attention by the retoucher, as each part of the negative will require a certain amount of hand-work in order that it may be in proper condition for printing. False lights, as well as various imperfections, may exist, and should be removed so they will not detract from the important parts of the photograph.

473. **Feathers on Hats.**—Frequently in negatives, where the hat is black and where very little detail exists in the black feathers, the shadows will be very transparent and detail should be worked in. Use a very soft pencil (a B or BB lead will answer) and apply the lead by holding the pencil at a considerable slant. Do not use the point of the pencil, as the lines will be too sharp and the finished result would then show the hand-work done on the negative. Follow the curves of the feather and work lightly, adding the proper amount of suggestive detail. The form and curves of the feather in the high-light part will give you a pattern to follow in the shadows.

474. When white feathers are on the hat, it may be necessary to etch away the chalky high-lights. If the high-lights are very broad and hard, they can best be toned down with the reducing paste. But if detail is visible in the little half-tones surrounding the high-lights and these half-tones do not show when printed, then shadows should be emphasized by shaving the film slightly with the etching knife. The single feathers can be etched with the point of the

knife, always following the curve of the feather, and working very lightly. When it is necessary to follow the stem of the feather and make this more transparent, the point of the etcher may be used to advantage, but as a rule you will find that either the flat edge or the rounded edge of the knife will be best suited for most of the work that requires shading. Whether the subduing is done with the etcher or paste, the parts which have been subdued will generally have to be blended a trifle with the pencil. Should the high-lights on the feathers appear flat or gray, catch-lights may be worked on the tips with a soft BB lead. If, for any reason, the etching knife should scratch instead of shave, or reduce a portion too much, such parts may be built up with the pencil so as to remove any lines or blemishes which might appear objectionable in the print.

475. **Outline of Hats.**—When using a black background and the subject has a black hat, it may be necessary to accentuate the outline of the hat in order to separate it from the background. This may be effected by an application of lead. Of course a sharp line should by no means be used—just a very slight suggestion of detail carefully worked in by using the side of a soft pencil, and then build up the little high-lights near the outline in proportion, carrying out the idea of the general shape or structure of the hat. The work required may be very slight, but no matter how little is necessary, the general appearance will be greatly benefited by this penciling. There must be some *relief* from the background in order to give an effect of atmosphere.

476. White hats on subjects posed in front of white backgrounds require just the reverse treatment. The etching knife must be applied to the outline and the shadows near the outline reduced in strength. This will, of course, produce relief and give more roundness to the head-dress.

477. **Ribbons.**—Ribbons in the hair should receive the same treatment as draperies. The high-lights if not strong enough may be accentuated by the application of lead. On the other hand if the high-lights are hard and opaque—lack-

ing in detail—the reducing paste or the etcher must be used to give them softness and half-tone effects.

478. **Building Up the Hair.**—In cases of under-exposure or where the hair is very dark, either red, auburn or black, there will be practically no detail in the shadow portions of the hair, and in the portrait this section would be represented more by smudgy, lifeless masses than by the detail, or, at least, a suggestion of detail, which really should exist. It is, therefore, necessary to work in detail very carefully with the pencil. Use a very soft lead (BB is none too soft) and, holding the pencil quite flat, make long strokes if the hair is straight. Should the hair be curly, follow the lines of the curls. Aim to retain the correct tone value and strive for general mass effects rather than to reproduce or form individual hairs. Sometimes this detail can be worked up by applying ground-glass substitute to the glass side of the negative and working on this side with a stump dipped in gamboge, or fine pencil filings. In employing this method use the stump very lightly, as a slight amount of the opaque substance will build up and produce shadow detail very easily.

479. As the color of the hair varies with different individuals, judgement must be exercised as to the amount of work required. Gray hair has much lighter half-tones and the lighter portions will very easily catch any strong illumination. In many cases, so intense will be this light that the etching knife will have to be employed in order to work in detail. Any hair, whether light or black, which is slightly oily, will catch the light, forming high-lights which will appear practically white in the finished print. This is actually a false light and it may be remedied by using the knife on the half-tone details in these high-lights. Strive to produce softness and have the hair appear natural, and do not overdo the work, for a slight reduction is practically all that is necessary.

480. Where stray hairs catch the light and show very opaque in the negative, contrasting with the transparent background, they must be removed with the etcher, using

the point only and following the line of the hair closely. If, on the other hand, the background is white, being opaque in the negative, and there are stray black hairs, they will have to be removed by using the soft pencil. When removing stray hairs with the pencil be sure not to allow the strokes to extend beyond the hair for if the background should not be absolutely opaque, the pencil marks would show unless kept within the transparent line of the hair.

481. Always build up the imperfections of the hair to match the surrounding tint, but do not allow either the pencil or the etcher to encroach upon that tint. Where strands of hair are etched on, careful consideration should be given to the shape of the outline of the hair. There should be no sharp points contrasting harshly with the background. Remember, curved lines are far more graceful than straight lines and angles. Do not, however, outline the hair too sharply. It must be soft not only where it contrasts with the background, but at the boundary line between the flesh and the hair. Softness adds atmosphere and beauty to the portrait. It is for this reason that women curl their hair, for the curls soften the outline of the face.

482. A careful study of the hair should be made before attempting to alter its appearance, and the beginner will find it very advantageous to proof the negative before attempting to work on it. After the first strokes of the pencil or the first application of the etching knife, another proof should be made, in order that you may accurately judge their effect.

CHAPTER XXX.

Lesson XXI.

Building Up Moved and Out-of-Focus Images.

483. A competent retoucher can do much to save faulty negatives. Not infrequently a subject when being photographed will move during the exposure, causing double lines of the image, or an out-of-focus effect. In the first case it is necessary to remove the lighter or less conspicuous of the two lines; high-lights will have to be etched away and shadows built in with the pencil. The most noticeable effect of movement is shown, however, in the high-lights, and the etching knife will be found the most useful tool to employ in correcting the fault. The strongest high-lights will, of necessity, have to be built up with the pencil, and the shadows may require a little etching in order to accentuate them and to give more contrast between the lights and shades. This will sharpen up the entire image.

484. Where the subject is out of focus, the strongest lines must be strengthened and the high-lights sharpened by applying the pencil, using a very firm, sharp stroke. For this purpose, a hard pencil usually serves best—an HH or H pencil may answer. A BB is a little too soft, and is liable to spread too much and not give sufficiently sharp lines. The lines of the mouth, eyes and nose may be strengthened by using the point of the etcher. The hair will also have to be treated in a like manner, using long, general strokes. The stroke must conform to the way the hair lies. If straight hair, make the strokes just as long as possible, of course having them come within reasonable limits. Should the hair be curled, the stroke must coincide with the curls.

485. The high-lights on the face should be strengthened, and whenever possible they should be sharpened. If the principal high-lights can be made to appear quite sharp the movement in the picture will be less noticeable.

486. The outline of the face will need to be strengthened somewhat, but great care must be exercised that this is not overdone and the general effect flattened, for where the outline is built up too much, the roundness and likeness of the subject will be entirely destroyed. As a rule the outline of the shadow side of the face will be accentuated by employing the etching knife. Strive to overcome the blur, mainly by sharpening the principal high-lights and do only enough work on the outline to blend nicely, keeping the outline in a much lower key than that of the strong lights on the face.

487. Where movement shows in the drapery, the same method of procedure should be followed, removing the secondary lines with the etcher and strengthening the original high-lights with the pencil. As a rule, the shadows will have to be accentuated by reducing them with the knife.

488. Lines of the hair will always show double in cases of movement, and the secondary high-lights will have to be removed and the shadows blended by reducing with the etcher. In cases of blurred images, the lines of the face and hair should be strengthened more than the drapery, and the high-lights are better kept in a lower key so the drapery does not detract from the face. With the drapery blurred or diffused in focus, and the face somewhat sharpened, the effect of blur or movement is less apparent.

489. Each negative will require special treatment, all depending on the nature of the blur and the amount of movement visible.

CHAPTER XXXI.

Lesson XXII.

Etching Single Figures from Groups.

490. The separating of single figures from groups occurs most frequently when copying from old group pictures, yet there are times when single pictures are desired from group pictures, perhaps only recently made. Or there may be cases where the group is not satisfactory, but some single figures are good and prints are ordered from them, thus requiring the separating of a single figure from the remaining members.

491. In Illustration No. 31 we present the results of copying a single figure from a group of two figures made from a very badly marred ambrotype. In Fig. 1 of this illustration we present a reproduction from the original; in Fig. 2 we show the first stage of the work; Fig. 3 illustrates the second stage of the work, while in Fig. 4 we present the completed portrait.

492. Beginning on work of this kind, first proceed to remove the surrounding subjects or objects from about the shoulders and head. In this case the first work performed was the separating of the child's face from the mother's shoulder and giving a natural outline to the waist and shoulders. This was done by first outlining the shoulders with the point of the etching knife, shaving the film into the face of the child. This completes the first stage.

493. For the second stage block out the entire print by painting out the surroundings with Strauss Marl, or any opaque may be used. For the first stages of the blocking the outline is traced very closely with the fine line of

the brush, and the broader surfaces are then painted in promiscuously. While the blocking out may be done on the glass side of the negative, yet it is better to do this work on the film side, for unless care is exercised in printing, when the blocking is done on the glass side, one is very apt to print a double line. This can only be avoided, under such circumstances, when the printing-frame is placed at a direct angle with the sun. So, to avoid this difficulty, the blocking may be done on the film side. This completes the second stage.

494. The final stage is accomplished in printing by the vignetting process. First, cut out an opening in a cardboard the shape of the image on the negative; then, covering this opening with fine tissue-paper, place this mask over the printing-frame, adjusting it to the negative. The opening in the vignetter is cut off just below the bust, and in order to gradually blend into the paper a little absorbent cotton is placed underneath the vignetter, at the lower edge, which permits the light to filter through the cotton and give a gradual blend to the printing. Platinum paper is the best to use for this purpose. As this has a coarse, grainy surface it does not show the lines of copying so much as the closer grained papers do, and it also vignettes much softer.

495. After the paper is printed to the full depth, it is developed, washed and dried. After drying, the sharp edges are slightly blended by rubbing over the surface of the print with a tuft of cotton applied to a little crayon sauce. It requires but a very small amount of the crayon sauce to produce the necessary results, and it is better to apply too little than too much, for if the work is not applied sufficiently heavy, it may be gone over again. The rubbing in of the crayon sauce, softening the lines and slightly clouding the background, completes the picture, as will be seen in Fig. 4 of this illustration.

Illustration No. 31
Etching Single Figure from Groups
See Paragraph 491

Illustration No. 32
Etching Thick Necks
See Paragraph 497

CHAPTER XXXII.

Lesson XXIII.

Etching Thick Necks.

496. With very fleshy people the neck is usually quite thick and sometimes quite baggy. There are extreme cases of goiter necks, which appear more conspicuously in the photograph than they really are in their normal condition. All such subjects can be very materially improved and very satisfactory pictures produced by a slight etching away of the objectionable portions.

497. In Illustration No. 32 we present a subject with a goiter neck which has been altered by etching. In Fig. 1 we have the subject as she actually appears; in Fig. 2 is illustrated the first stage of the alteration; in Fig. 3 we have the altered results complete. In altering a negative of this kind we begin first by outlining the neck to the collar line. It would be advisable for the student, in a case of this kind, or in fact a case of any alteration of any consequence, to always make a proof-print of the negative first and then with the pencil outline the first stage on the proof, following this outlining on the negative.

498. The outline on the negative is done with the point of the etching knife, gradually scraping or shaving a line which supplies the collar outline. With this done the first stage of the work is completed, as will be seen in Fig. 2. For the final stage all of the neck below the outline is etched away with the curved side of the blade. The etching away of the neck also supplies the collar to the dress. After the film is reduced and etched away, the harsh lines are then gone over and softened with a BB pencil and a slight high-light worked on the collar, which gives the dress a perfectly natural appearance, as will be seen in Fig. 3.

CHAPTER XXXIII.

Lesson XXIV.

Opening Closed Eyes.

499. The eye is the most delicate feature of the face to work upon, for unless this feature is carefully treated there is every chance for loss of likeness. Improperly handled, this feature also changes the entire expression of the face. When pictures from a particular negative are desired in which both eyes are closed, it would be advisable to obtain another negative of the subject, making the face the exact size of the negative in which the eyes are to be opened. If it be impossible to secure the original subject, and it is important that you produce prints from this negative, you might make a negative from another member of the family whose eyes are, as nearly as possible, like those of your subject. Failing this, you may obtain another photograph with eyes the exact shape, and then follow the lines of these eyes on the negative obtained as your design. Of course, all this requires considerable work and would be quite costly to the purchaser. It is understood that this would be a rare case and only employed where a satisfactory likeness is required which cannot be supplied in any other way, and the pictures are desired made regardless of expense. Under such conditions the work *can* be done, and hence the object of this instruction.

500. It is seldom that we have subjects requiring the altering of both eyes to any great extent, and only in rare cases do we meet with the necessity of supplying a *pair of eyes*. This necessity might occur only when a flash-light picture was made and the eyes closed during exposure.

With this as the only negative of the subject, the best result possible must be obtained. Or, again, we may have old copies to reproduce in which the eyes are practically faded away and must be replaced. The most numerous cases are those where the subject has lost one eye, or where one eye has a bad defect, or subjects with glass eyes which do not match in the photograph and must be corrected.

501. There are also cases in ordinary portraiture where both eyes may have been closed during a part of the exposure, or the subject may have winked considerably during the exposure, thus producing the effect of a blur or veil over the eyeball. Any of the above, and many other corrections, can be made by means of the etching knife and pencil, but one must work very carefully and intelligently. By following the general instruction for this work given in this volume, and studying carefully the various illustrations showing the different stages of the work, you will have no difficulty in accomplishing good results.

502. In talking of the eye, it may be well to state that the eye is built up of the iris, the pupil and the white. The iris is the colored part surrounding the pupil, which is the black center of the eye. The catch-light on the eye is the little white spot or high-light on the iris.

503. It is advisable, when you have a negative of importance that requires special work on the eyes, first to take a discarded plate, or perhaps two or three of them, and practice on them until you feel you possess the ability to work on a more valuable one. Where only one eye is defective, or is closed, an outline of the other eye or eyelid should be drawn or sketched on transparent tissue-paper. This you do by placing the negative in the retouching easel, glass side toward you, and then laying the tissue-paper on the glass side of the negative and viewing it by transmitted light. Next, with the pencil, draw the outline of the perfect eye on the tissue-paper. Now invert the drawing, placing the pencil side next to the glass, and adjust it gradually over the defective eye. The tissue may be fastened to the glass and held in place with a little paste attached to the

outer edge. Now invert the negative with the outline tissue on the under side, so that you may work on the film side of the plate.

504. By using the transparent paper for your outline in drawing the eye you are not so apt to ruin the negative, as you would be if working without any guide. The size and shape should be accurate in every respect. With the etching knife well sharpened, the outline of the eye and iris may now be etched on the film. The point only of the etcher should be used for outlining, and care must be exercised when working with it that you do not cut through the film to the glass. The etching knife should be sharp enough to make each stroke with the knife barely discernible, yet gradually shaving down the outline until it grows sufficiently transparent.

505. When tracing the outline on the film, bear in mind that you are viewing the pencil drawing through the thickness of the glass on your negative; therefore, you must view the outline *directly over* the negative while tracing the outline on the film. To view the work from one side will displace the image and may cause you to lose the shape of the eye and iris, or colored part of the eye. After the outline has been etched upon the negative, the tissue pattern may be removed. It may be preserved, however, for future reference, if desired. Remember that where you have black pencil lines on the paper, you will require transparent lines on the negative.

506. To illustrate the opening or altering of eyes, we have selected the most difficult subject possible, and illustrate herein a case where both eyes are closed. In Figs. 1, 2, 3, 4 and 5 of Illustration No. 33, we present a series of pictures showing the different stages of the work, illustrating the method of procedure for correcting or opening closed or defective eyes. In Fig. 6 is presented a picture of the same subject with the eyes opened. The outline for the eye to be added was obtained by tracing on transparent tissue paper the normal eye from the plate used in Fig. 6, the tracing being done from the glass side of the plate.

When completed, this tracing was adjusted at the back of the eye of the negative to be worked, and attached on the edges of the glass with a little ordinary paste.

507. With this accomplished, the negative is placed in the retouching desk, film side toward you, and then, with the etching knife perfectly sharp, the eyelid and iris of the eye are outlined. This is done with the point of the etcher, scraping in a gradually curved line, first, the shadow or edge of the eyelid, next the fold of the upper eyelid, and finally the outline of the iris and the eye itself. This completes the first stage, as shown in Fig. 2.

508. For the second stage we proceed to the etching and building of the pupil. In building the iris or colored part of the eye, we begin shaving the film, following the curve of the outline of the iris, gradually shaving the film in all parts except a small speck in the upper corner, which is preserved for the catch-light or small white spot on the eye. All this work is done with the curved side of the blade. To work conveniently and follow the curve of the pupil more easily, the negative is turned at different angles to permit of shaving in the one direction at all times. Continue turning the plate until you have worked all around the inside of the pupil, with the exception of a tiny spot which is to be retained as a catch-light. In working or shaving the film on the iris, do not attempt to work to the full depth the first time around, but shave lightly at first and then go over the space a second time.

509. The catch-light must be located on the side of the eye nearest the light and must not be connected with the eyelid, nor should it extend too far into the pupil, which is the small black spot in the center of the eye. Neither must it blend into the whites of the eye, but must be located in the upper corner of the iris toward the source of light. If the catch-light is placed against the eyelid the roundness of the eyeball will be lost and the result be a perfectly flat surface.

510. Etch the pupil (which is the central round part of the eye) until it is sufficiently transparent to print quite

Illustration No. 33
Opening Closed Eyes
See Paragraph 506

Illustration No. 34
Straightening Crossed Eyes
See Paragraph 515

dark, but do not etch down to the glass, as this would give a black, lifeless spot, which would by no means represent a a natural appearance. (See Fig. 3.) It is advisable to make frequent proof-prints between each stage of the work, that you may have a positive guide to work by.

511. Proceeding to the fourth stage, we will complete the pupil, or black spot, of the eye. This is done with the curved blade of the etcher, shaving the film quite close below the catch-light in the eye, but located in the center of the iris. The pupil should be made perfectly round and the film scraped about two tones lower than the iris. If any difficulty is experienced in obtaining the roundness, the point of the etcher may be employed and the negative turned at an angle while working, thus enabling you to work always one way. Instead of turning the blade of the etcher to follow a curve you merely turn the plate around until the entire circuit is made. With this done we have completed the fourth stage of the work, and will next proceed to the fifth or final stage.

512. Beginning this stage we proceed first to reduce the high-light on the eyelid, subduing it to the tone of the surrounding flesh. This we do with the etching paste, rubbing the space gently with the end of the finger, which has previously been charged with the paste. Before applying it to the eyelid, first rub the finger charged with the paste over the film of some discarded negative. This is done to remove all excess paste and harshness, and what paste remains on the finger will be sufficient to do all the reducing that is necessary. Now apply the finger to the eyelid, cautiously rubbing it lengthways and *with* the curves of the lines until the surface is sufficiently reduced. Do not be alarmed if you should, by chance, extend the reduction beyond the eyelid, as this will do no harm, for you will have an opportunity afterward of building up any such portions with the pencil. In fact, in this case in particular, it is rather desirable to spread the reducing a trifle, as this has a tendency to blend the etching and the outlining previously accomplished, thus adding softness.

513. With this completed, the next stage is to build up the dense shadows surrounding the eyeball, softening the outline, etc. This part of the work is best done with an HH lead and is very important. The lead must be applied carefully, to give softness and mellowness to the eye. The shadow line should, of course, be in deeper shadow nearest the nose than on the other end of the eye, as the part of the eye next to the nose is set a trifle deeper in the head. In consequence, there is less light reaching this portion than the part nearest the source of light. With the lower line softened and nicely blended, we next proceed to softening the line created by the fold of the upper eye-lid. Following the curve of the line, we gradually subdue its harshness and wherever rough edges appear they are blended into the general curve. With this accomplished we then conclude the work by cleaning up the eye, as it were, working over the white portions, removing any blemishes that may exist, and toning the white of the eye gradually toward the ends. Finally, spread the catch-light slightly, subduing this speck a trifle. With this done, the eye is completed and compares very favorably with Fig. 6, the natural eye.

CHAPTER XXXIV.

Lesson XXV.

Straightening Crossed Eyes.

514. Of the more numerous corrections made to the eye, we find none so frequent as the straightening of crossed eyes. Much can be done, however, in the making of the negative to assist the retoucher and save a considerable amount of work if a little care be taken under the skylight. The secret of photographing cross-eyed people lies in getting the straight eye perfectly natural, paying no attention whatever to the other one. Where both eyes are crossed, turned in, or out, as the case may be, then we must endeavor to get the best position possible of one of them before making the exposure. The most difficult eyes to straighten when making the negative are those where one eye turns in and the other out, for in such cases it is really difficult to obtain a normal condition of either eye. All one can hope to do is to make the exposure when either eye is at its best and do all the correcting on the negative afterward.

515. The method of procedure for straightening the eyes by retouching and etching is exactly the same as for opening the eyes. If one eye is normal and the other one needs straightening, you proceed first to secure an outline or drawing of the straight eye on tissue paper and place it on the glass side of the defective eye. Of course the drawing must be inverted and attached to the glass side with the pencil drawing side next to the glass. In Illustration No. 34 we present a case of crossed eyes. Fig. 1 of this illustration shows exactly the appearance of the eyes before altering.

Fig. 2 shows the first stage of the work done, and Fig. 3 presents the eyes both balanced, which appear very natural.

516. In beginning the work we first obtain, as said above, a penciled outline of the normal eye on a piece of transparent tissue-paper, working from the glass side of the plate. With this obtained, we invert the outline and place it over the opening of the defective eye, and with a little paste attach it fast. Then, turning the negative over, with film side front, we trace the outline of the iris of the eye with the point of the etching knife. This completes the first stage, as will be seen in Fig. 2.

517. For the next and final stage we first apply the reducing paste to the white of the eye. This not only reduces the strong whites, but also blends the outlining done with the etcher, after which we pencil the black objectionable portions of the original iris and pupil, building up the white of the eye in the left-hand corner. As a considerable amount of work is required to eliminate the heavy black shadows, a soft BB lead is employed. With these obliterated we next proceed to work in the iris of the eye. This is done with the curved blade of the etcher, shaving the entire opening in the outline of the iris except a small speck to be left to supply the catch-light. With the iris reduced to the proper stage and the catch-light rightly located, we then proceed to etch the pupil of the eye, which, in this case (the eyes being very black) should only be carried one shade deeper than the iris. With this done, the eye is completed as will be seen in Fig. 3.

518. **Eyes Blurred—Caused by Movement.**—When the eyes are only slightly blurred, as for instance, by movement during the exposure, causing a sort of veil over them, and there yet remains a suggestion of an outline, you will not need to make an outline of the eye on tissue-paper. Follow the suggestion of outline already in the film, first etching in the pupil and iris, and then penciling the whites of the eye and blending them with the shadows. If the eyelashes show too strongly below the

eyeball they should be toned down with a soft BB lead. If careful thought is given to defects of this kind, and if you proceed to work in the manner just described, you will experience no difficulty in correcting any errors and in perfecting negatives which would otherwise be undesirable.

519. It is advisable always to make proof-prints from a negative before attempting to do any work on it at all, and proof-prints should also be made at different intervals showing the progress made. These will also serve well as a guide for you to judge the work being done. It is also advisable to file all proofs which you make and place any necessary data on the back of each for future reference.

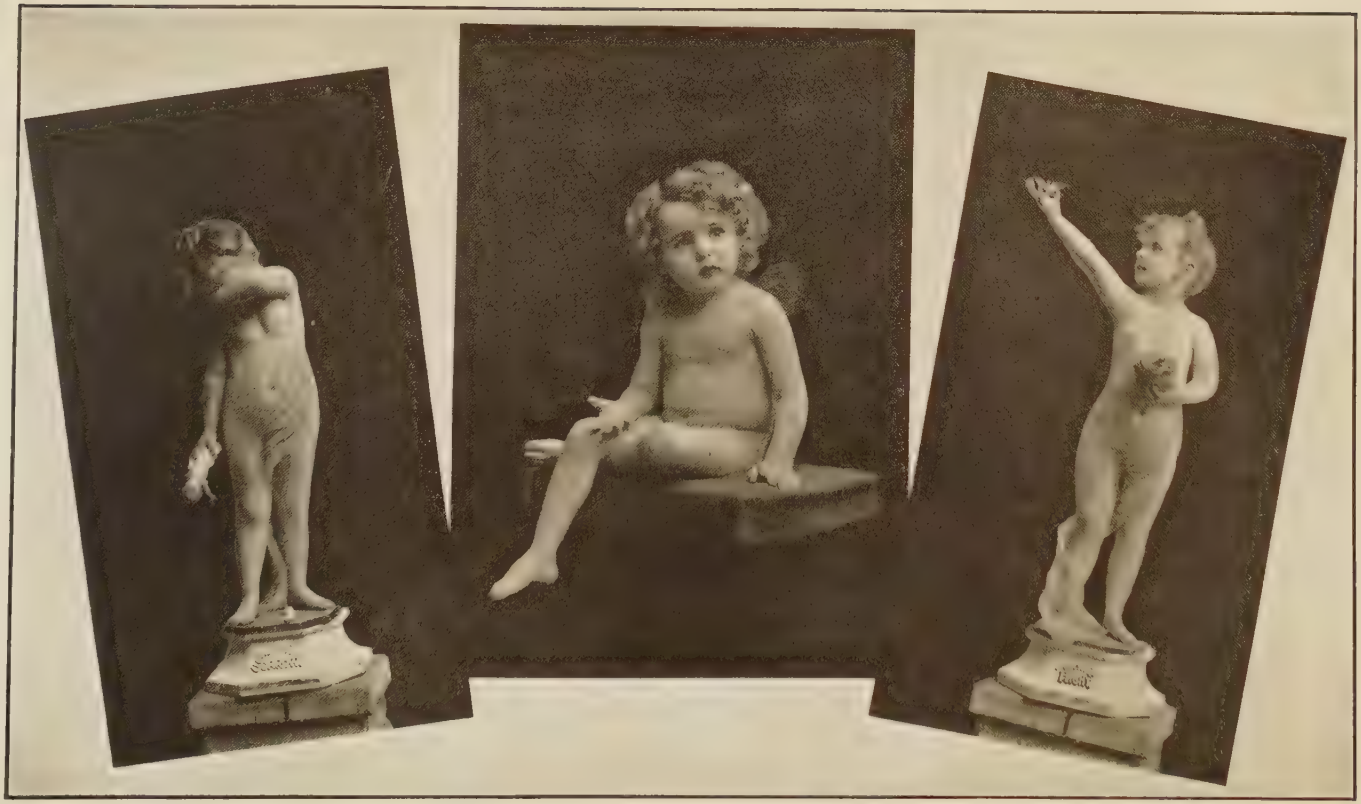

Fig. 1 Fig. 2 Fig. 3

Illustration No. 35
Statuette Portraits
See Paragraph 521

CHAPTER XXXV.

Lesson XXVI.

Etching Statuettes.

520. Departing from the regular commercial retouching work, it is possible to produce some very pleasing and artistic effects which are always appreciated by the picture-loving public. For special work, and particularly along advertising lines, the retoucher will be called upon to work up negatives and prints, securing effects differing vitally from the original. The clever use of the etcher and pencil will enable the photographer to produce almost any desired results along such lines.

521. **The First Step.**—The first step in producing such results is the pose and lighting of the subject. Of course, you must determine in advance just what you desire to produce, and with the idea of what is wanted thoroughly fixed in your mind, then proceed first to pose your subject, taking care that you have the proper lighting. If the lighting is not carefully handled considerable difficulty will be experienced in properly regulating the effects of the light and producing the desired results. In Illustration No. 35 we show a group of three statuette portraits. The little subjects used for this illustration, as you will observe, appear to be of almost perfect form.

522. In Fig. 1, a statuette entitled, "The First Sorrow," illustrated by a child weeping over a broken doll, we have a very characteristic pose, and the lighting of the subject gives it still more life. The drapery surrounding the little form is nothing more or less than a strip of light chiffon. In order to give boldness to this picture and have

it stand out in relief, the entire background was etched away, and even a portion of the drapery removed, and to make this last appear soft and in folds, slight shadows were etched therein.

523. The outlining of the statuette is, perhaps, the most difficult part of the work and with figures such as those represented in this illustration, this is the most important feature, for there is every danger of ruining the shape of the figure. So, in outlining a figure of this kind, you begin first by etching a line all the way around the figure, and very close to it, but not encroaching on the figure itself. The etching of this outline is done with the point of the etcher.

524. **The Second Step.**—After the outline is etched, then the remainder of the background is shaved away with the flat side of the blade of the etching knife and the entire film is removed, scraping through to the glass, thus giving a black background. With this accomplished, using the curved side of the blade, the edges of the outline in the film are gradually blended into the figure, thus supplying roundness thereto in place of harshness. You will observe in the head of Fig. 1, that the outline has not been blended, between the head and the outline the space being still visible, thus leaving a rather ragged edge to the head. The remainder of the body being nicely blended, is quite an improvement over this portion.

525. There are opportunities, as before stated, for improving the shape of the figure, for portions may be added or imperfect parts removed. In this little subject close inspection will show you that the calf of the leg has been added to, giving this member better proportions. In Fig. 2, the sitting subject, the outlining of the figure is completely blended, and to look at the picture you would never know that any etching had been done to produce the black background. The little wings etched onto the shoulders were produced with opaque applied to the negative, the surplus spread of opaque being scraped away with the etching knife, leaving the shape of the wings.

526. In Fig. 3, the little subject entitled, "The First Flight," is a very interesting study, the outlining having been done in the same way as before, but the bird and bird's nest were added to the portrait after the negative was made. The child was posed looking at her right hand, which is open; in the left hand she held a rubber ball, which was afterward transformed into a bird's nest. In making the bird's nest the top of the ball was etched away and with a soft BB pencil a sort of fuzziness worked into its place, giving it the appearance of straw and leaves, while the bird in the hand was etched from the light background which previously prevailed before the background was all cut away. You will observe that the extended arm has been somewhat altered (made larger). Had we followed the outline of the arm it would not have appeared in proportion to the remaining figure (as you can see from the illustration), and yet the alteration made would not be detected unless one's attention were called to it.

Illustration No. 36
Advanced Etching—Statuary from Life
See Paragraph 527

CHAPTER XXXVI.

Lesson XXVII.

Marble Statue.

527. In Illustration No. 36 we present an entirely different class of work. In this case we make a marble statue from a living subject, with all the likeness retained. In making a negative for such work, a light background is usually employed and a broad lighting is given the subject. In Illustration No. 36 is represented the four stages of the work. To begin with, the subject was arranged with the shoulders and arms bared and with the waist surrounded with soft cheese-cloth, a piece of white goods being extended over the skirt of the subject, the object of this being to supply a surface upon which to outline the pedestal. The arms, as you will observe, drop in a natural curve, giving roundness and a normal shape to the shoulders. The subject was placed in a broad light and the negative developed to a fairly good strength. The broad light and strong development overcomes a great many of the wrinkles and faults which would need altering if the negative were made in a lower key of light.

528. In beginning the work of this subject, we first started the outlining of the bust and pedestal. Previous to the outlining on the negative, however, a proof-print was made and the design crudely drawn with a pencil on the proof-print. With this done, a piece of tissue-paper was placed over the print and the outlining of the proof-print traced thereon. This transparent tissue-paper was then attached to the glass side of the negative, with the pencil side next to the glass. We next, with the point of the etching

knife, traced these outlines on the film of the negative, with the results as you see them in Fig. 2.

529. Extreme care must be exercised in etching this outline, otherwise you may cut too deeply into the film. It would be better to etch scarcely far enough than to overdo it. Exactness is not entirely necessary in outlining the figure and pedestal, providing you have not etched the film too deeply. If etched too deeply the corrections will be difficult to make. With the pedestal outlined we next outlined the arms, cutting them off in equal proportions. At this stage, all that is required is a crude outline, for the arms should be given a broken appearance in imitation of a statuette, when completing this work. Of this we will speak later.

530. The next stage will be the retouching of the face and bust, remembering that the face is not to be polished the same as the pedestal. It is not as smooth and may be retouched with a heavy coarse stroke, producing a sort of coarse stipple. All lines of the neck must be eliminated. This work is done with a BB lead and the entire face and bust rounded and modeled, using either the HH or BB, or both, as the occasion requires.

531. With this done we next proceed to etch the hair. The hair and eyebrows on a statue being white instead of black, we proceed with the work of changing the hair from black to white after retouching the face and neck. The simplest way to produce this result and the one followed in making this illustration, was to make a good strong transparency from the negative, after which we proceeded to etch the hair on the transparency, following the lines, curves and folds of the hair in their natural direction. In order to preserve the folds of the hair as they naturally appeared, it was necessary to retain light shadows for the outlines of the different curves and folds, so these were allowed to remain in the positive.

532. When working on the transparency—the positive—you must bear in mind that you are working just the opposite to what you would be if etching the negative, for

wherever the film is reduced in the transparency, a high-light will be produced on the finished print; therefore, the deeper you etch the whiter those portions will appear in the print. In a negative, of course, the more you reduce the film, the stronger will be the shadow produced in the print. As the marble statues usually appear snow-white, the etching of the hair will necessarily need to be quite deep or transparent, for the deeper you etch the hair or shave the film in the positive transparency, the heavier and more dense will these portions appear in the negative which is to be made.

533. With the etching of the hair and eyebrows completed, we next make a negative from the transparency which will show the subject with white hair and eyebrows.

534. On this new negative we next proceed to work up the pedestal and break off the arms. The outline of the pedestal gives us our pattern to follow. We first shave the film gradually from each corner of the base of the bust, working lightly as we near the high-lights or front portion of the base. With this completed we proceed to the lower cap, then to the top of the pedestal, and finally to the breaking of the arms, which concludes the work of Fig. 3.

535. The next stage of procedure is the outlining of the entire subject and the supplying of the black background. The outlining is done with the point of the etching knife, outlining the entire subject, and working within a thirty-second of an inch from the figure. With the subject all outlined, we scraped away the remaining film of the background with the broad straight edge of the blade, scraping the film through to the glass. Next, in order to give softness to the outline of the subject, the curved edge of the blade was used and the film of the outline gradually blended into the figure, thus giving a soft, mellow relief, as illustrated in Fig. 4.

536. A more simple way of removing the surplus film from the background, instead of cutting the hard, dry film away with the etcher, is as follows: Having outlined the figure, the film surrounding the figure may be moistened

by applying a tuft of absorbent cotton, saturated with water, to these portions. Then, by using the etcher the film may be much easier removed. Care must be exercised, however, when this method is employed, that the water does not spread to the figure, as this would ruin it entirely.

CHAPTER XXXVII.

Character Expressed by the Shape of the Head, Nose, Eyes, Ears, Chin and Mouth.

537. The elements of human nature—the characters of individuals—are expressed by certain faculties located in the head. When the mind is concentrated on a particular thought, a certain part of the brain is developed and in growing causes a prominence to be formed on the skull. This concentration of thought on certain subjects soon shapes the character of the individual and the muscles of the various features of the face are altered accordingly.

538. Very few workers give much consideration to this subject, yet it is one which deserves attention by the retoucher who desires to apply his art to the very best advantage. Physiognomy, phrenology and character reading are actually sciences, and can be relied upon absolutely to give a perfect reading of the character of the individual, providing you understand the principles involved.

539. It is impossible to take one feature and judge the character of the individual by it, for there are times when the nose, for instance, might, by its shape, indicate that the individual was of a strong commercial temperament, yet the balance of the head might discredit this entirely. As a rule, however, much can be depended upon by each of the features, and if one feature expresses a certain faculty the other features will conform to it.

540. Some people are of the opinion that heads mean nothing, yet in order to let you judge for yourself, we desire that you compare the two accompanying figures in Illustration No. 37. Fig. 1 is an outline of the head in which the thinking, moral and esthetic faculties stand out

the strongest. In fact, all of the higher faculties are most strongly developed. This is exemplified by a high forehead, the high frontal top head, the broad temples, and the expansion of the upper half of the back head. In these portions are located all of the better, unselfish, humane, cheerful, moral and spiritual faculties. When these exist strongly in the individual they shape the head as illustrated. Whatever is the shape of the head so will be the shape of the face. Notice the face in particular and see the happy, tender, true, refined, friendly, generous and cheerful expression.

541. Compare Fig. 2 with Fig. 1. Notice in particular

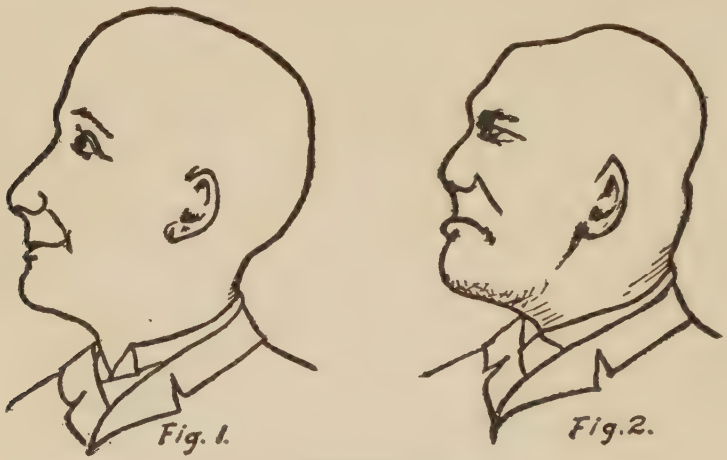

Illustration No. 37
Character Chart—General Shape of Head
See Paragraph 540

the shape of the head. It is exactly the opposite of that in Fig. 1. Observe also, how the face corresponds. Now, which of these two persons would you rather meet on a lonely highway? Your preference, we know, will be for the first one. When it comes to a practical test, a test of life or death, or a test of dollars and cents, then prejudices are immediately dropped and physiognomy and phrenology are at once accepted. This is but one case, yet it serves its purpose in demonstrating the importance of character reading.

542. Our object in introducing this subject in an elementary way in this volume, is to acquaint you with the necessity of retaining all of the good qualities of the individual and trying, so far as is consistent, to alter or modify the predominating undesirable qualities. The charts which accompany this chapter are intended simply as outline illustrations which you may use as guides for altering or retaining the shape of the different features.

543. As a preliminary caution, we wish to impress upon you the advisability of retaining in the negative as much of the characteristics of the individual as possible. Do not attempt to carry the altering of the features to an extreme. This is by no means advisable and we discourage it most emphatically.

544. **The Nose.**—There is an almost endless variety of shapes of noses and these different shapes very truthfully tell the character of the individual, but as previously stated, one should not fully depend upon the shape of one feature alone. The faculties in the other features of the face must also correspond to a certain extent, at least, with those expressed in the nose if a truthful rendering of the character of the individual is sought.

545. Illustration No. 38 shows a series of profile outlines of noses, and the following table indicates the character which they represent:

546. **Table of Character—Nose.—**

Figure 1. Positive and Masculine.
Figure 2. Antagonistic.
Figure 3. Motive.
Figure 4. Balanced.
Figure 5. Thinking.
Figure 6. Vital.
Figure 7. Imitative.
Figure 8. Erratic.
Figure 9. Good and Bad.
Figure 10. Looking.
Figure 11. Commercial.
Figure 12. Selfish and Hopeful.

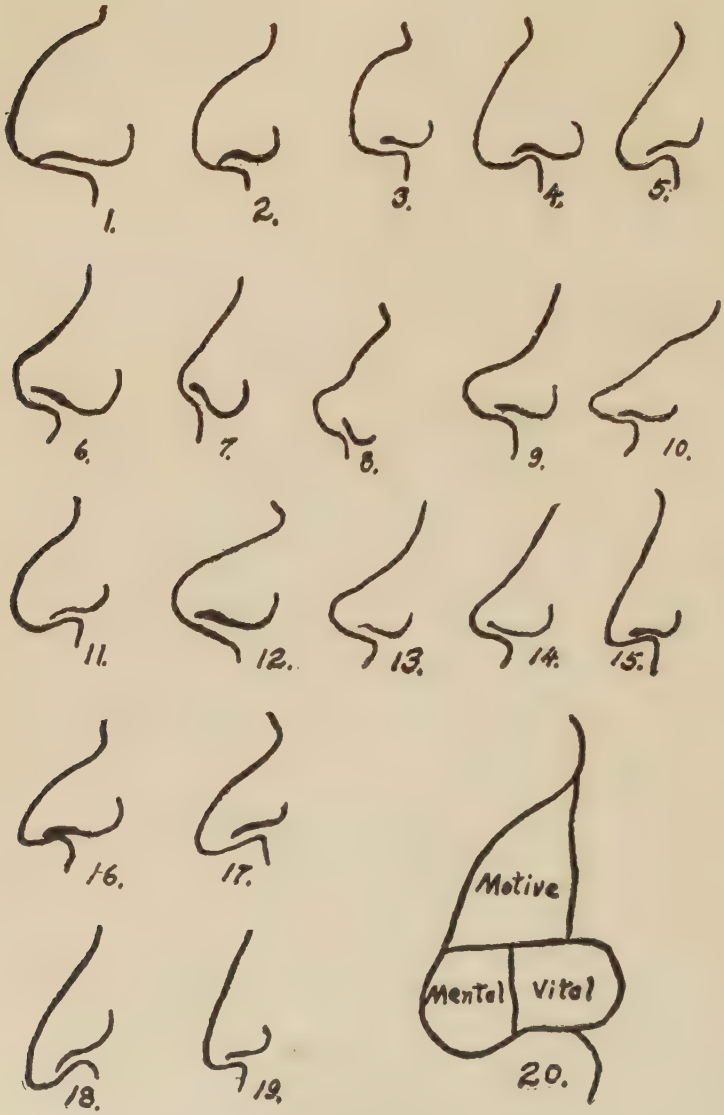

Illustration No. 38
Character Chart—Noses
See Paragraph 545

Figure 13. Negative.
Figure 14. Feminine.
Figure 15. Neutral.
Figure 16. Cunning.
Figure 17. Peculiar.
Figure 18. Deceitful and Pessimistic.
Figure 19. Intellectual.

547. Figure 20 shows the three divisions of a well-balanced nose. Different faculties build different parts of the face. The *vital faculties* of the brain build the wings of the nose, chiefly, and give it fleshy thickness. The *motive faculties* build the bone of the nose and make it Roman in form. The *intellectual faculties* chiefly build the tip of the nose. Extreme cases of either are not always desirable, and when such cases occur it may be advisable to slightly alter the shape so as to make it more balanced.

548. **Applications.**—This chart of noses is important to every retoucher. In fact, few retouchers realize the value of knowing how to properly represent or retain in the negative the character of the individual. We do not advocate that you alter the character of the individual in the negative, but there are cases when a *faculty* will so greatly build up a feature that even when lighted properly it will be exaggerated. You should know how to reduce this exaggeration and be able to model the nose so as to give the feature the best possible shape, thereby representing the better characteristics of the individual.

549. As is the *head,* so is the *temperament,* and as is the *temperament* so is the *nose.* Noses mean something. They have direct causes. These are the faculties. They may be much mixed, but in such cases the faculties and temperaments of the individual will be correspondingly mixed. There are many marked cases which strongly illustrate this principle. Some of the noted men, in whose noses the *motive temperament* is very strongly illustrated, are Generals Sheridan, Sherman, Logan, Miles, Napoleon, Moltke, Napier, Admiral Dewey, also Lincoln and Grant. Lord Salisbury, Robert Ingersoll, Senator Mason and Dwight L. Moody have the *vital portions* of the nose most strongly

Illustration No. 39
Character Chart—General Shape of Head, Mouth, Lips and Chin
See Paragraph 552

developed. A distinct prominence of the *mental part* is shown in the noses of Herbert Spencer, Robert Louis Stevenson and Eugene Field. The three faculties are very equally developed in the noses of George Washington and Henry Ward Beecher.

550. A thick nose, particularly just above the wings, with a tendency to turn down at the tip, is one of the strongest signs of *selfishness*. The outline of such a nose is shown in Figure 12, of Illustration No. 38, but a front view will very clearly illustrate and show that characteristic of the individual.

551. When retouching profiles it will not only be an interesting study to compare them with the chart of noses, but it will also be a valuable training to you in observation and in enabling you to reproduce the very best character in the individual. Always use as your guide the outline shown in Figure 20, which is a properly balanced nose. If, for example, your subject had an *antagonistic* nose, as shown in Figure 2, you could very slightly add to the tip of the nose with the pencil, and then slightly reduce the extreme point of the curve on the ridge. Should the other extreme, that of *deceitfulness*, be strongly developed, as in Figure 18, you should apply the etcher to the tip of the nose and shorten the mental portion. A very little addition made to the motive section of the nose would do no great harm. Bear in mind, however, that we do not advocate extremes in these alterations, for you must not vitally change the appearance, in the negative, of the character of the individual. However, when undesirable faculties are very pronounced, it is advisable to reduce them. It is far better to have the exaggeration tend toward the ideal, thus giving credit to the individual, rather than to leave the undesirable qualities emphasized.

552. **General Shape of Head.**—Although not of so great importance to the retoucher, yet it is of value to know the most desirable shape for the head if the better characteristics of the individual are to predominate. You should clearly remember the shape of the head shown in

Figure 1, Illustration No. 39. This is a deceitful head. Notice the hollow spots on each side of the top; observe the form of the eyes, and also the pointed ears. Comparing this head with that shown in Figure 2, you will see a wide difference in all of these parts. This head is round and full, with a high forehead; the ears are rounding at the top, while the eyes are open.

553. In cases where the upper part of the head is narrow and the lower portion, through the jaw, is broad, the individual is, beyond doubt, of a lazy disposition. To counteract this appearance in the retouching it might be advisable to etch away a portion of the outline of the jawbone, and by penciling and removing part of the hair, to thus broaden the forehead and give a more balanced appearance, similar to the front view of the face shown in Fig. 2, Illustration No. 39. This is a typical, honest face and head, and it will pay you to remember it.

554. **Mouth and Lips.**—Much is expressed in the individual by the shape of the mouth and lips. A few examples are shown in Illustration No. 39. Figure 3 illustrates a *deceitful* mouth, while the *honest* mouth is shown in Figure 7. Figure 4 shows characteristic lips of the person having strong *self-esteem* and *firmness*. Figure 5 is the shape of the lips expressing strong *friendship*. An *impulsive* person will have lips similar to those illustrated in Figure 8. Signs of *honesty* are expressed by a firm, steady mouth, while those of *selfishness* are shown in the closely shut mouth, also thick lips, which do not show the red part to any extent. *Selfishness* is also expressed in the projection of the muscle under the lower lip, which causes it to look sullen and *jealous*. The thinner the lips the *less affection*. The more the teeth are shown the more *love of applause*.

555. **Chin.**—Especially in profile views can the retoucher alter the character expressed by the chin. The chin which is shown in Illustration No. 39, Figure 6, is a *deceitful* one, and the consistency of the person having such a chin should not be depended upon. The square chin is the sign of *honesty*, and in retouching you should

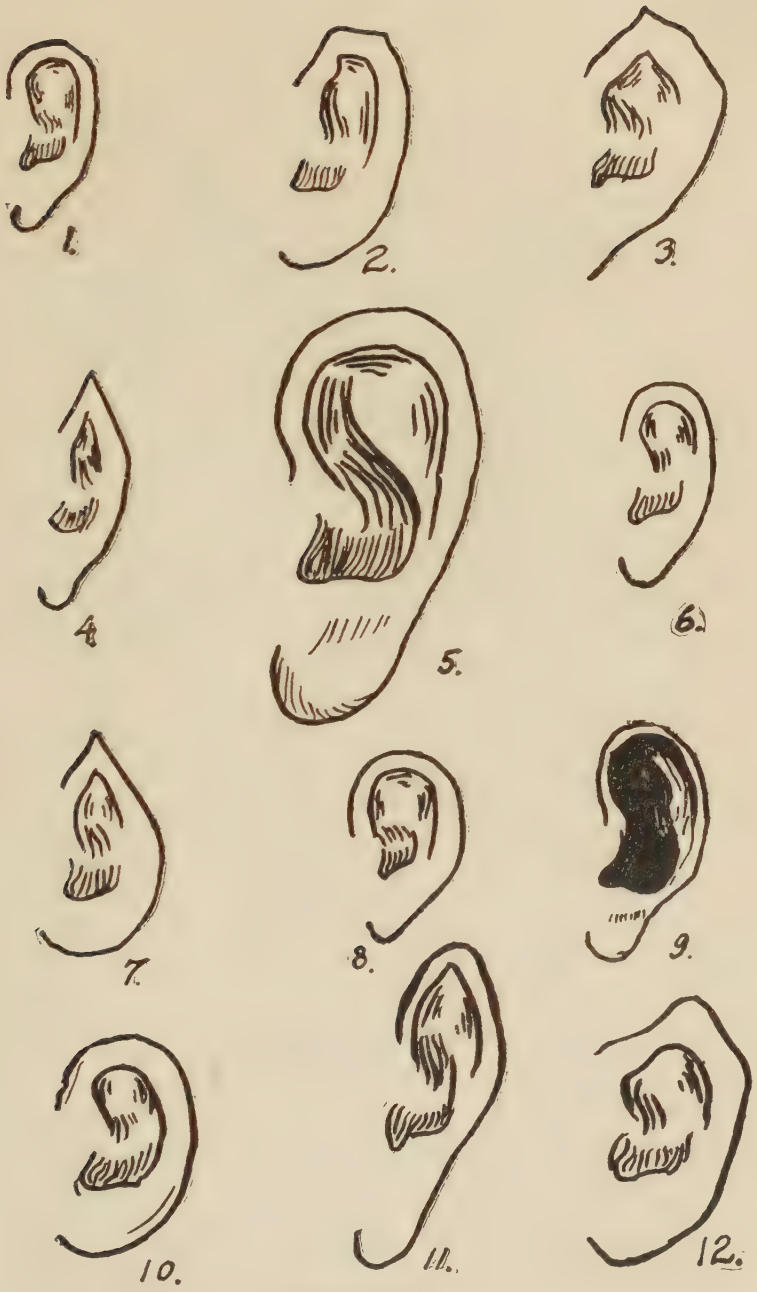

Illustration No. 40
Character Chart—Ears
See Paragraph 557

aim to secure the shape shown in Figure 7. Be careful, however, not to carry the work too far to the extreme, for by greatly altering the shape of a chin which expresses dishonesty, you will, of necessity, have to alter the other features as well. If one faculty is strongly developed in a feature it is in almost every case similarly developed in the others. Therefore, before attempting to work on or alter any portion of the face, you should make a careful study of all the features and decide upon your method of procedure, in each and every one of them. Then you are in a position to proceed with the modeling.

556. Again we would caution you not to carry the work to the extreme, so as to lose the likeness of the individual. A slight alteration, however, is often permissible.

557. **Ears.**—Especial attention should be given profile views of the face, or such views which show the shape of the ear quite distinctly. Reference to Illustration No. 40 will show you the importance of knowing the character as expressed by the shape of the ear.

558. **Table of Character—Ear.—**

Figure 1. Feminine-shaped ear.
Figure 2. Masculine-shaped ear.
Figure 3. Ear of a selfish individual.
Figure 4. Ear of a foxy individual.
Figure 5. A correctly-shaped, well-balanced ear.
Figure 6. Ear of a candid individual.
Figure 7. Physical-shaped ear.
Figure 8. Mental-shaped ear.
Figure 9. Musical-shaped ear.
Figure 10. Vital temperament.
Figure 11. Ambitious ear.
Figure 12. Ear of the uncultivated.

559. Strong signs of *dishonesty* and of a *deceitful* individual are expressed by the ear having a pointed tip, similar to the one shown in Fig. 7.

560. As Fig. 5 shows the correct shape of a well-balanced ear, this should be your model.

561. **The Eye.**—Eyes and heads go together. As a

Illustration No. 41
Character Chart—Eyes
See Paragraph 562

rule eyes express more character than any of the other facial features. They are not merely organs of vision, but, by their expression, they show the true character of the individual in a more complete and varied way than any of the other features. The sentiment expressed by the eyes is always true to the individual. The muscles around the eyes cannot represent in a striking manner each separate faculty; therefore, they do not express the faculties in a permanent manner. The character, however, is shown more in a transient way. The sentiment expressed through the eyes is done with the lids rather than the eyeballs.

562. The expression of the eye is almost wholly controlled by the contraction and relaxation of the lids. This will be easily understood by referring to Illustration No. 41. Fig. 1 of this illustration represents a *deceitful eye,* and Fig. 2 is an *honest eye.* Fig. 3 shows the eye of a *sincere* individual, while Fig. 4 is another example of a *deceitful* one. *Cruel eyes* are represented in Fig. 5.

563. Eyes do not close of their own accord. They are operated and controlled by the mind and by the various faculties. The eyelids act as protectors to the eyes and when the indivdual is *selfish* or *destructive* in his nature and desires to withhold these facts from the world, the eyelids tend to close. *Mirthfulness,* however, gives a twinkle to the eyes by contracting the lids and forming lines running directly outward from each corner. An open, steady eye that can look *you* in the eye without an effort, one that is not restless or that looks out of the corners at you, one in which the upper eyelids are inclined to form angles, represents an *honest individual.* The more closed the eyes the more *secrecy.*

564. The least amount of work possible should be done on the eye, as this feature is extremely delicate. Unless you have become quite expert in the handling of the etching knife and the pencil, you will experience difficulty in attempting to alter the eyes. When you feel you have control over the knife and pencil, then you are at liberty to change the eyes to whatever extent you deem it necessary. But, as much of the character is expressed in such a delicate way in these features you should proceed very carefully in attempting to make any alterations. What changes are made should tend toward the ideal, in order that you may show the best of the subject's characteristics.

CHAPTER XXXVIII.

Lesson XXVIII.

Babies and Aged People.

565. The faces of babies and aged people require very little retouching. In fact, if the photographer has properly lighted and posed his subject there is not one case in ten in which it will be necessary for the retoucher to apply his pencil to the negative at all. It is quite true that there might be pin-holes in the negative; there might be small imperfections on the face, which should be removed, but this is such an elementary stage in the art of retouching that it is hardly necessary to consider it. The majority of children up to the age of eight years have very clear complexions, and to touch the pencil to their features would be to immediately encroach upon nature and destroy the little characteristic expressions of the face.

566. There will be times, however, when the operator has failed to properly illuminate or model the face, and then it devolves upon the retoucher to blend from the high-lights into the shadows, and thus carry out the roundness which naturally exists. To blend these shadows and soften the high-lights, proceed with a very light touch, beginning at or near the edge of the high-light and work with a moderately short stroke. There should be no perceptible grain to the surface, as the skin of a child is so soft that it has no grain—that is, none that can be observed at a distance of a few feet. If you have not noticed the appearance of the flesh of a child you should cultivate your faculty of observation, for you must know how your subject naturally appears before you can properly apply the pencil to the negative and expect to truthfully reproduce the original.

567. The flesh of **aged people** is just the reverse in appearance to that of a child. Each feature is full of character, which has been gradually moulded through the years that the individual has been fighting the battles of life. To alter these with the retouching pencil would be a crime against photography. The photographer should in the first place, of course, have correctly posed and lighted the subject, so as to bring out all of the good qualities, and to so illuminate the wrinkles that they are not exaggerated. The photographer can, just as well as not, photograph aged people so that the retoucher will have no penciling to do on the negative, except to remove minor blemishes.

568. There is, however, a class of subjects whose faces contain small yellow patches, which will not affect the sensitive plate to any perceptible degree, thus causing lighter patches in these parts. It will be necessary to build these up to match the surrounding tints, by applying the pencil in quite long general strokes. Do not attempt to fill in these blotches solid, as you would then destroy the actual flesh value. The grain in the flesh of aged people is quite coarse, as a rule, and therefore you should use long strokes in retouching, so as to reproduce this same effect.

569. Do not remove wrinkles altogether. If the portrait has not been properly lighted; if too much back light has been employed; if not enough reflected light has been thrown into the deeper shadows; if the direct source of light has not been sufficiently diffused; if the angle of light is not correct; in any of these cases it will be necessary for the retoucher to blend the deeper portions of the wrinkles, and also to lighten any shadows which may appear to join the high-lights too abruptly. The finer lines which are formed at the end of the wrinkles may be removed and the depths of the wrinkles built up a mere trifle, so that they will not appear too prominent; but the greatest of care must be exercised that the character is not altered in the least, and that the very slightest amount of penciling be applied to the negative. Referring to Illustrations Nos.

17 and 18 an idea may be obtained as to the amount of retouching that should be placed on work of this kind.

570. As a rule, the flesh of children is very soft and does not reflect light to the degree that the more oily skin of the aged person does; therefore, the tendency in child portraits is to flatness, while that of the portraits of aged people is toward extreme contrast, and even an exaggeration of roundness. One reason in particular for this is, that the photographer photographs the child in the broad, open light, so as to reduce the exposure to a minimum. When aged people are the subjects the photographer generally tries to make an artistic study. He will then reduce the size of his light, and this, of itself, concentrates the illumination onto the features, accentuating those portions which are nearest the skylight or window. The oiliness of the skin readily reflects the light in these particular spots, and these, together with the deep shadows, which give a great amount of contrast, really exaggerate the effect of roundness.

571. Bearing these points in mind, the retoucher should, if he attempts to work on the negative of a child, build up the high-lights a trifle, so as to do away with the flat appearance which might exist in that particular negative. When retouching negatives of aged people the high-lights should be reduced in strength, so as to flatten out a trifle the extreme effect of contrast.

572. *Remember,* that the very least amount of retouching should be applied to negatives of children and aged people. Each stroke that you take on the negatives of such subjects will, in the majority of cases, simply aid in the destroying of likeness, as well as expression, of the individual.

573. The beginner should always make a proof of the negative before attempting to retouch it. Study this proof and compare it very carefully with the negative. Then, if you find that it is necessary to remove a slight imperfection, proceed to do so. If it is necessary to build up a shadow a trifle, very carefully work in the portion which

needs to receive the detail. Should the high-lights be too weak, build them up a trifle, while if they are too strong they should be reduced at the very start by applying a little reducing paste if the area is somewhat large, or by using the etching knife if a very slight amount of reduction is required. Notice how the faces of children, as well as aged people appear in the average light of the home, and then try, to the best of your ability, to work along the lines which would give you these same effects in the finished print.

CHAPTER XXXIX.

Lesson XXIX.

Worked-In Backgrounds.

574. The large collection of ordinary stock backgrounds of different designs, usually seen in the better class studios, is rapidly disappearing, and in their stead plain painted or felt grounds are employed. For all worthy work this plain ground is converted into one suited to the subject being photographed.

575. The ground itself is not altered, but the background of the *negative* is worked over and changed to suit the effects desired. The work is all done on the back of the negative, and is quite simple when once understood. With a little study and care you can inject a large percentage of originality into your pictures, making them distinct from the ordinary kind. They will be exclusive and better prices will be paid for them. In making negatives with this idea in view, black painted or felt backgrounds should be used, as this work can only be applied successfully over black or very dark backgrounds. Neutrally tinted grounds can be used for making the negative, but before any work is done the background should be locally reduced with Red Prussiate reducer; it then becomes a black background and can be worked upon exactly the same as if the black background had been used when making the negative.

576. When making negatives expressly for this purpose, you should have an idea in mind of just what you want to make, and this idea is then carried out throughout the entire operation, from the posing of the subject to the finishing of the print. Frequently you can make a negative in the ordinary way, and by altering the background

considerably improve the picture; but the best results are obtained when the negative is made with the special purpose of supplying the background effects afterward.

577. We present, in Illustration No. 42, a reproduction from a negative which was made expressly for the purpose of working in the background. The subject was posed with the arm resting on a black rest, which is invisible in the negative. The negative was fully timed and the developer started first with weak diluted developer, Pyro-soda, using stronger developer for local work, such as building up the high-lights. This was done by dipping the fingers in strong developer and slightly rubbing over the high-lights or the parts near the strongest lights, and the drapery was in turn kept down in tone by local application of Bromide, using a 10% solution and applying this solution to those parts of the drapery that we wanted to hold back. After partially developing the plate in this way, normal developer was used to complete the development. The plate, after being fixed, washed and dried, was next flowed on the glass side with ground-glass substitute. When this dried (which required only a few minutes) the negative was placed in the retouching easel, with the ground-glass side facing out. The stone wall was first outlined faintly, using a hard retouching lead and applying it very lightly.

578. An ordinary desk rule was used as a guide for the straight lines. After the outline was completed these parts received a faint coating of crayon, applied with a stump. The crayon was first mixed with an equal amount of pumice, to give it a little grit and also neutralize the color. A very small amount of this crayon is all that was required for the lower section. The top layer of the wall, being more in high-light, required a little heavier application. The sharp edges were worked in with a soft pencil, and the dark lines with the etching knife. This completed the wall.

579. The outline in the background was first sketched lightly with a hard pencil on the ground-glass, and then crayon applied, first very lightly, a No. 2 stump being used

Illustration No. 42
Worked-in Background—Subject Specially Posed
See Paragraph 577

Illustration No. 43
Worked-in Background on Ordinary Negative
See Paragraph 581

with scarcely any crayon visible on it, yet sufficient to accomplish the work. The first attempt was not quite heavy enough, and a second application was necessary, with the results as you see them in Illustration No. 42.

580. In this illustration you will observe the artist has supplied a background which greatly enhances the artistic value of this portrait. This was not an accident, but is the result of careful thought, a thorough understanding of lines, careful treatment of light and shade, correct spacing and balance. The atmospheric effect is exceptionally good. Its pictorial quality, contrast and concentration are nicely handled.

581. For example, we have the straight line a trifle below the center, which is represented by the top of the wall. The line, however, is broken, first by the pose of the subject, and then by the natural breaks in the top of the wall. To the right of the subject, in the background, we have quite a light spot. This light spot suggests the source of illumination for the face. The spot in the background does not appear harsh, as it is broken by the tree. The tree is very much out of focus; there is nothing sharp or definite about it, and it curves into the picture and not out of it. The out-of-focus effect suggests atmosphere. To the left of the subject you will find another light spot, a suggestion of a small tree and shrubbery. This light spot carries out the effect of the horizon, where sky and earth meet. The light spot being parallel with the strongest lights on the left side of the background—practically forming another straight line—and again broken by the subject, adds very much to the perspective and brings the image forward and away from the background. You will notice a high-light on top of the wall near the arm. This is suggested by the light spot on the background. The entire tone of the background, while it is lighted up here and there, is soft and subdued, and the effect thereby produced is charming. Another example of worked-in backgrounds, where a plain black ground was originally used, is shown in Illustration No. 43.

582. **Note.**—When mixing the crayon and pumice, mix them in an ordinary dry-plate box, and only a little at a time. Spread the crayon and pumice well over the bottom of the box, so as to enable you to charge the stump lightly or heavily. When using the stump, before applying to the ground-glass first draw it over a piece of strawboard, practically removing all visible crayon, and then apply to the ground-glass.

583. **Caution.**—Never apply heavily, even if you require a strong high-light, for if applied too heavily it is difficult to remove, and if the application is not heavy enough, it is a simple matter to go over the surface, or at least those portions that need strengthening, a second time, and touch them up a little. Just remember that the faintest amount of color will show; so be guided accordingly and you will, after a few experiments, be able to produce very pleasing effects.

584. In Illustration No. 44 is presented an enlarged negative with a worked-in background. The original exposure was made on a 5 x 7 plate, a transparency made by contact, and an enlarged negative made from the transparency. After developing the enlarged negative the background was locally reduced to very nearly clear glass. The glass side of the negative was flowed with ground-glass substitute, the design was faintly sketched on the ground-glass and then worked in with crayon, and the shadows were emphasized by etching on the film side of the negative.

Suitable Backgrounds for Different Style Pictures.

585. In selecting suitable backgrounds to be worked into any negative, one can do no better than study some of the reproductions of the great masters. The different backgrounds on their work very often supply most beautiful effects that may be copied and used for backgrounds on negatives.

586. The most elaborate collection of reproductions from the work of artists of all nations may be found in the Perry pictures. These pictures are furnished in sizes from

Illustration No. 44
Worked-in Background on Enlarged Negative
See Paragraph 584

AT-HOME PORTRAITURE

STUDY NO. 8 J. H. FIELD

5 x 7 upward, at a price as low as one cent each. One can do no better than to provide himself with a variety of these studies. These studies cover the Dutch, French, Italian, German, Flemish, British, Spanish and American art, and a collection of one hundred or more of them will prove of valuable assistance to you in your background work, as well as in general art work. By sending 4 cents to the Perry Pictures Company, of Malden, Mass., they will furnish you with a catalog containing thousands of subjects, some of which are brought together in different groups. Each subject contains a number, which number should be used when ordering.

587. For the benefit of our readers, however, we have selected a list of one hundred different studies (see "Reproductions from Old Masters," Vol. VI), covering portraiture and landscape background work. These numbers supply a fairly representative collection, and included in this collection are studies by Reynolds, Rembrandt, Cimabue, Taddeo Gaddi, Fra Angelico, Fra Filippo Lippi, Michaelangelo, Titian, Raphæl, Correggio, Millet, Rosa Bonheur, Breton, Murillo, Franz Hals, Drüer, Holbein, Gainsborough, LaFarge, Whistler, Sargent, etc.

588. One hundred studies of the small size will be supplied by the Perry Pictures Company for $1.00. The majority of these prints are printed both in black and white and in sepia. The sepia is what is known as the *Boston Edition,* and really gives softer effects than the black and white. The Boston Edition is always supplied in all prints in which it is printed, unless otherwise requested.

589. Larger sizes than the above mentioned may be obtained in special sets, upon application to the publishers.

590. **How to Reproduce the Background on Negatives.**—First of all, these pictures suggest some very artistic positions for studies, which may be followed to some extent at least. In making your original negative, use a plain black, or very dark background for this purpose, and afterward work in the background to harmonize with the portrait. With the negative made, whether made specially fol-

lowing some particular study, or even if only a commercial negative where the background is to be added, select from amongst your studies the background suitable for your subject, and laying it on a table place a piece of tissue-paper over the print and trace the outlines of the background on the tissue-paper.

591. Care must be exercised in selecting the background to be used, that the lighting is in the same direction. However, an inverted lighting may be employed equally as advantageously as a correctly lighted one, for all that is required is to invert your transparent drawing on the tissue-paper when applying it to the negative. With the drawing made, and having previously ground-glassed the glass side of your negative, now place the outlined tissue-paper, with the lighting in the proper direction, on the film side of the negative, attaching the tissue temporarily to two edges, with gum stickers. Next, place the negative in a retouching easel, ground-glass side toward you, and then begin tracing the outline from the tissue onto the ground-glass, using an ordinary pencil dipped in crayon sauce, or even dry yellow ochre will answer very nicely. Apply the material very lightly, as the least amount applied will show its effect, and if it should not be applied sufficiently heavy it may be gone over again a second time, while if applied too heavily at first it is difficult to erase.

592. After the background is traced on to the ground-glass, remove the tissue-paper and make a proof-print from the negative, to see the effects made on the background. If any alterations are to be made the proof will serve as a good guide for you to follow.

593. By this means any style background used by the old masters of the different schools may be employed, and some really wonderful effects produced. These study pictures, of which further reference is made in Volume VI, will also be of wonderful benefit to you along the lines of composition and atmosphere, for which these studies are all noted, and which the photographer can learn to accomplish by following these masters.

CHAPTER XL.

Lesson XXX.

Retouching Landscape and Architectural Negatives.

594. A very mistaken idea seems to prevail among a large class of workers, that retouching applies only to portrait negatives. It is a fact that there are very few negatives produced that could not be improved in one way or another, if ever so slightly, by a certain amount of penciling or etching as well as other hand work. Little defects are bound to present themselves, which, if left in the negative, may entirely ruin what would otherwise be a very pictorial effect. Then again, there are many subjects which could be greatly improved if one only knew the manner in which to make the necessary alterations.

595. **Landscape Subjects.**—The chief defects in landscape negatives, from the standpoint of the artist, are halation; too much or too little intensity; over-strong highlights or shadows; lack of clouds through over-exposure of sky; blurred figures and trees; light streaks from faulty plate-holders; undesirable loss of detail through hazy spots; imperfect lighting of subjects; lack of definition at the edges, due to imperfect covering of the plate by the lens used, etc. All of these defects may be remedied more or less by proper treatment.

596. There are various ways of accomplishing the desired result, but the manner of proceeding to work upon the negative to make the necessary alterations is practically the same as that for the retouching of the portrait negatives. Etching receives first consideration, and then the reducing paste is applied where necessary, the paste, of

course, always being used after a certain portion has been etched, in order to smooth up the raggedness that might have been caused by the use of the knife. The application of the lead to the mediumed film is the last step, with the exception that at times it will be found necessary to use what is known as "splatter" work on the glass side of the negative.

597. **Architectural Subjects.**—The alterations necessary in negatives of buildings and various architectural subjects are somewhat different than those required in landscape and other exterior work. There are two distinct reasons for photographing an architectural subject, the first being to produce a technical record of the subject, which necessitates obtaining minute detail in every feature; the second, being simply to secure artistic interpretation of the subject.

598. The greater portion of the necessary hand-work on architectural negatives is the straightening and strengthening of lines, accentuating of high-lights and shadows, and the removing of any defects which might have occurred during the process of manipulation, such as pin-holes, air-bells, light fog, etc.

599. **Etching.**—In landscape work the knife will be chiefly required to remove specks, high-lights on leaves, and for sharpening moved figures. Where figures or objects have moved, the double outline in the denser portions must be cut away and such shadow detail as may have been marred by the movement put in with light touches.

600. The negative should always be carefully studied before attempting work on it. First decide what obnoxious patches of light should be removed or subdued in the lights and shadows. Both the etching knife and the reducing paste will come into play here. The latter is very essential where large patches of light are to be reduced, as, especially for the beginner, an even reduction is much more easy to secure with the reducing paste than by employing the etching knife, for it requires much more practice with the knife, to become skillful, than with the reducing paste.

You should, however, practice as much as possible with the use of the knife, for it is by practice only that you will master it.

601. The Schriever Reducing Paste is a most excellent medium to employ for this purpose. It is possible, however, to use the mixture given in Chapter XXIII, paragraph 370. There are times when portions of the negative may be reduced by the application of pumice-stone or rotten-stone (the latter being of a much finer grain), a piece of cotton being dipped in absolute alcohol (not methylated) and this, in turn, in a little of the powdered stone. This mixture should be evenly applied by friction to only that portion of the negative that you desire to reduce. When the density has been cut down to the required depth you can wipe the powdered stone from the negative with alcohol, and then if the appearance is satisfactory, proceed to work on the patch of light which you wish to subdue.

602. **Reducing Hight-Lights and Fog.**—The process just mentioned can be employed to remove fog and halation, and to reduce high-lights or a streak of light crossing the negative caused by using an imperfect slide in the plate-holder. This latter, however, is a very difficult thing to rectify. It will be found best to work upon the broader patches with either the alcohol and pumice or rotten-stone or the reducing paste, but the narrower portions should be handled with a pointed piece of India rubber charged with dry pumice or rotten-stone, or a small stump may be employed to apply the reducing paste. No matter how much care you have exercised in removing a streak, it will, no doubt, be necessary for you to pencil and blend certain portions afterward in order to remove all trace of it. A stump dipped in fine pencil filings may assist in slightly building up certain portions which you may have reduced too far.

603. When working on high-lights you should not only consider their density, but you should also observe the range of gradation from the highest point of light to the deepest shadow and strive not to flatten or destroy the

roundness which originally existed in the negative. Your aim should be to produce as much of an atmospheric effect as possible, by softening the outlines of more distinct objects in the landscape scene.

604. In technical architectural subjects, less attention should be paid to the matter of atmospheric effect and your thought concentrated on producing as strong and clear detail in the high-lights and in the shadows as possible. You must aim in such architectural subjects to exactly reproduce the original and make a perfect record of it. When the making of such records is not required, but, on the other hand, a more artistic result is wanted, it is permissible to work along somewhat different lines. The technical view must be absolutely sharp in every portion, while the artistic subject demands only the foreground in sharpest focus, the portions toward the background and farthest from the camera gradually becoming diffused.

605. The retoucher must bear these points in mind when working on different classes of negatives, for it is just as essential to carry out the sharp idea in the technical negative as to aim for diffused effects in the artistic one. In every case it is necessary that the negative should have been correctly exposed and developed. If for any reason the photographer has failed to do his part, the retoucher must correct his mistakes, building up detail in those portions which lack it and accentuating high-lights which have not been properly built up in developing.

606. Sharp lines which need reducing should be worked on with the point of the etching knife, while broader portions will be best handled by scraping with the flat, or perhaps the curved side of the knife.

607. **Penciling.**—When the process of reduction has been satisfactorily accomplished, the retouching dope should be applied to the negative, and whatever detail needs strengthening must then be worked in with the pencil. The pencil must be sharpened in two ways. In fact it is desirable to have two different leads, yet one lead may answer the purpose if you wish to use the two ends. One

end should have a round, moderately fine point, similar to that used in regular retouching, and the other should have a flat-edge shape as employed by draftsmen, the latter being especially useful for inserting detail in foliage and in building up or accentuating straight lines. As a rule, a fairly soft pencil should be employed, such as a B or BB lead. There is not so much danger of the pencil strokes showing in the work on landscape negatives as on the face of the portrait negative, for in landscape and architectural subjects you have to deal more with straight lines rather than with building up broad portions.

608. **Retouching Trees.**—To successfully retouch trees, you should observe their appearance in nature and use the correct form of touch to bring them out properly, just as you would if you were making a pencil drawing. You must remember, however, that you are working on the negative and not on a positive. Sometimes the broad and sometimes the narrow surface of the chisel edge will be most useful, as they enable you to make either broad or narrow touches as required.

609. For working on such trees as the oak, beech and elm, use the broad edge, while for fir, ash, chestnut and willow the sharp edge will be most serviceable. Use the pointed end of the pencil when retouching birch, weeping willow, poplar and other trees which have fine leaves.

610. In retouching buildings and other architectural subjects, the chisel edge will, as a rule, be most serviceable in spreading lines and in strengthening outlines. Where signs or lettering appear prominently, it will be necessary, in almost every case, to accentuate the high-lights on the letters, in order that they may stand out more boldly than they would if left untouched. This lettering is, as a rule, a very important part of the technical architectural picture, and it must be perfectly clear and distinct and attract attention. When you observe these signs on a building itself, they stand out very boldly, owing to the brilliancy of the gilt, of which the letters are generally composed. This yellow, however, reproduces very dark, as it does not

affect the sensitive plate to the degree in which you might think it would. Therefore, it is invariably necessary to build up the high-lights on these letters and also to outline them very carefully on the negative. The high-lights may often be accentuated by reducing the shadows a trifle with the etching knife. This, of course, should be done before attempting to retouch the negative with the pencil.

611. There are times when the brass or other metallic trimmings on a building will reflect light very strongly—to such an extent that it will be necessary to reduce the strong high-lights formed. Then again, if these same trimmings are in the shade, they may, owing to their color, reproduce altogether too dark and require building up with the pencil to their relative tonal value.

612. All of the work which will be required on technical architectural negatives will require careful thought on your part. If the best of results are to be secured you should observe the appearance of various architectural subjects, together with their trimmings and ornaments. Notice the effect of various lightings on the subject, as this will do much toward enabling you to gradually improve your work upon the negative and produce the most satisfactory results.

613. **Working on Back of Negatives.**—It is not necessary to have all of the alterations made on the film side of the negative. In fact, a great deal of work may be applied on the glass side, which will be far more effective in enabling you to secure perfect results than if you attempted to secure the same effect working in detail on the film side. The first step is to coat the glass side of the negative with ground-glass substitute, so that you may have a substance on which to work—one that will hold the materials which you will employ. Although ground-glass substitute can be made, it is far more advisable to purchase it from the dealer in photographic supplies. The prepared medium will give far better results than that which you might mix yourself. If, however, you desire to make your own substitute, we have found the following formula to give excellent satisfaction:

614. **Ground-Glass Substitute.—**

Gum Sandarac	90 grs.
Gum Mastic	20 grs.
Dissolve in Ether	2 ozs.
Add Benzole	1 to 1½ ozs.

Never use more than 1½ ounces of Benzole—1 ounce will usually be found best. *Benzole* must be *fresh.*

615. To coat the glass with the substitute you should proceed in exactly the same manner as if you were flowing the negative with retouching varnish. Extreme care must be exercised, however, that none of the substitute runs over on to the film side of the negative, as it would be practically impossible to remove it without damaging the film. Begin to pour the substitute on the corner of the negative farthest from you—holding the negative in the left hand, by the left corner. Pour a sufficient amount of substitute on the negative to permit of its flowing evenly over all portions. Avoid an excess amount, however, as it would then run over on the film side. Tip the negative a trifle to the left, and when the substitute has reached the left corner, again tip the negative so that the substitute will run toward your left hand. Just before it reaches the thumb again tip the negative to the right and allow the substitute to quickly drain back into the bottle. The substitute sets very quickly; therefore practice the operation until you become somewhat dexterous in evenly coating the glass.

616. Avoid coating any part of the negative twice with the substitute, as this would, of course, increase the density of that particular portion. If you will carefully follow out the above suggestion, you should experience no difficulty after a few attempts in applying the ground-glass substitute evenly.

617. To accentuate shadows—that is, to cause a deeper printing of them—take the etching knife and cut away the ground-glass substitute directly over them, carefully shading or blending around the edges of the opening thus produced. As the thickness of the glass will cause a slight diffusion, you should not make this opening quite as large

as the shadow which you wish to accentuate, for if made too large a slight line may result and ruin the shadow portion. High-lights are built up by working on this ground-glass substitute with a stump dipped in pencil filings, but where fine lines are to be strengthened, a soft pencil may be used to advantage. The amount of work necessary will depend entirely upon the results which you desire to produce, and it may be necessary to make proofs from time to time, in order to learn exactly what is the effect of the work that you have placed on the negative.

618. Another favorite method of working on the negative is to apply a sheet of cepa-skin (French onion-skin) paper, or very fine grained tissue-paper, to the back. This paper is sometimes known as papier-mineral. Cut a piece of this paper the size of the negative to be worked up, lay it in the water for a moment, and then place between blotters. Around the edge of the negative, on the glass side, apply a little mucilage or weak glue. Lay the damp sheet of tissue-paper on the negative, pressing it down slightly on the gummed margin, and set up on edge to dry. It will dry in a very short while, and the tissue-paper will be found to lie perfectly smooth and be tightly drawn.

619. The tissue-paper lying over the dense parts of the negative, or over parts which are to be printed deeply, can be cut out with a sharp knife; or, if a knife is not handy, or it is not desired to cut the paper, a solution of one part of balsam to six parts of turpentine can be applied to the paper, which will cause it to become transparent. Other parts of the negative which require lightening can be worked up with a stump, rubbed in pencil filings, liquid charcoal, or with some light water-color. This tissue-paper backing will give the same effect as the ground-glass substitute, but in an increased degree.

620. In many pictures, more especially those made with hand cameras fitted with ordinary rapid rectilinear lenses, a decided darkening will be noticed in the corners of the print. This is caused by the inability of the lens employed to carry the light to the corners or edges of the plate

in the same strength as to the center. The negative of such a picture will be found to be almost clear glass at the corners. This can be remedied by applying charcoal with a stump to the paper backing of the negative, blending it down from the corners toward the center of the negative. In this way the unevenness of the negative can be removed so that the print shows no defect of the lens.

Illustration No. 45
Pencil for Marking on Glass
See Paragraph 621

621. Although the above methods are by far the most practical ones, it is possible to work on the back of the negative without applying any ground-glass substitute. The Faber Company manufactures a special pencil, shown in Illustration No. 45, which may be used to work in high-lights on the back of the negative, and where only the high-lights are to be strengthened this pencil will be found a very convenient method of securing the desired result.

622. **Splatter Work.**—There are times when it may be desirable to apply splashes of opaque to lighten portions on the negative or to represent stones, flowers, snow, etc. The best results are secured by taking a fine tooth-brush and, after dampening it, lightly charge with India ink or liquid opaque. The negative should be placed almost flat on the table, film side down, inclining slightly toward you. The portions that are not to be splattered should be covered with a piece of paper. Hold the charged brush over against the negative and bring the teeth of a fine-tooth comb quickly over its surface (drawing it toward you). This will result in a fine spray of splashes, which come from the brush to the negative.

623. After a little experience this will prove to be an excellent method to employ in giving appearance of flowers over grass. It may be necessary to do a little penciling afterward, however. If applied over water you will produce

the effect of water-weed and lilies. With a little practice you will be able to deposit small splashes over the parts of the landscape farther away from the camera and larger ones in the foreground.

624. **Pin-Holes.**—To spot out pin-holes, which subject will be considered in the following chapter, you need considerable practice, experimenting with one of your negatives which is defective from pin-holes caused by dust, or one in which exists fine transparent spots, due to air-bells. Make a proof on glossy printing-out paper of this negative, so as to show the existing defects as strongly as possible. Then place the negative in your retouching desk and proceed to pencil or remove, or build up, the transparent spots.

625. **Accentuating Details.**—The average landscape negative can be very much improved by some little retouching, or "dodging," as it is usually called. Glints of sunlight on the tree trunks can be brought out prominently, giving snap and sparkle to the scene; touches of high-light here and there on the leaves; or reflections on water intensified, all help to make a picture more lively.

626. **Adding Sky to Landscape.**—But no landscape picture can be considered complete without it has some form of a sky, or at least a sky value. A method of introducing a sky into a picture which otherwise shows nothing but blank paper in that portion has already been described in Volume IV, but another method frequently used and capable of giving very fine results is the following: Make or select a sky negative which is in keeping with the character of the landscape negative with which it is to be fitted. Make a transparency of the landscape negative, keeping the sky portion very clear. (If necessary use a little Ferricyanide of Potassium Reducer, to reduce the sky.) Next make a transparency of the sky negative, laying the landscape transparency film to film with the plate on which the sky transparency is to be made. The image on the landscape transparency will prevent the sky negative from printing on the sky transparency, and you will have

a perfect match. When finished, bind the two transparencies film to film, and make a negative by contact or by projection, which will then show the combined landscape and sky negatives with no objectionable joint lines showing. The slight diffusion caused by the thickness of the glass will be no detriment to the picture. On the contrary it will lend atmosphere and pictorial charm.

627. **Avoid Over-Retouching Which Produces False Effects.**—It is a very easy matter to overdo dodging or retouching landscape negatives, and so produce a false effect. Much of the work shown at exhibitions is overdone, giving a pleasing effect at first sight, but easily degenerating into a staginess and unnaturalness which deceives no one. A careful study of all nature effects should precede any attempt at extensive retouching or modeling of a landscape picture.

628. With practice, close attention to values in nature, and a thorough understanding of what it is you desire to reproduce in your pictures, you will soon be able to take almost any negative, however flat or harsh it may be, however lacking in tone values or over-filled with detail, and make of it a most presentable picture; but, as we stated a few lines previously, you should never attempt to produce an effect contrary to nature. A striving for a sensational or bizarre effect will only bring ridicule from those who understand the real harmonies of nature.

629. All of your first work should be proofed before attempting to modify the negative, also after having completed your work. If any special alterations or methods of procedure were employed, you should make full mention of them on the back of the proofs, and when these are filed in your proof-file they will prove of value for reference.

Negative Varnish.

There are a great many different kinds of negative varnishes—some are applied to the negative cold, while for the application of others it is necessary to heat the negative. The following formulæ will be found to give per-

fect satisfaction, if the directions accompanying each are carefully carried out:

COLD VARNISH.

Best Grain Alcohol .....20 ozs.
Crushed Dark Shellac .....1 oz.

Shake occasionally for several days until dissolved (without heat). Allow it to settle; then decant carefully from the settlings and add two drams of oil of lavender. The negative should be slightly warmed before varnishing.

COLD VARNISH.

Sandarac .....1 oz.
Mythelated Chloroform .....6 ozs.

Shake until dissolved, then filter.

NEGATIVE VARNISH APPLIED WITH HEAT.

Shellac .....3¼ ozs.
Sandarac .....¾ oz.
Mastic .....40 grs.
Castor Oil .....1 dr.
Rectified Spirit .....30 grs.

Dissolve and filter.

HOT VARNISH.

Sandarac .....1¼ ozs.
Benzoin .....6 grs.
Alcohol .....20 ozs.
Oil of Lavender .....4 drs.

Dissolve by shaking, and filter.

Removing Varnish from Negatives.

Immerse the negative in mythelated alcohol for five minutes, and rub with cotton. If any resin remains, add a little ammonia to the alcohol and place the negative in it, rubbing with the cotton. Rinse twice with alcohol and flow water over the negative. The latter should run evenly.

Another method to remove varnish is to prepare a solution of:

Caustic Potash .....1 oz.
Mythelated Alcohol .....10 ozs.
Water .....10 ozs.

Put the negative in a dish, pour on the solution, and gently rock until the varnish is dissolved. Then wash well under the tap.

CHAPTER XLI.

Lesson XXXI.

Spotting Negatives and Prints.

630. Small particles of dust on the sensitive film of the unexposed plate will, if allowed to remain there, retard the action of the light when an exposure is made, so that when the plate is placed in the developer no action will take place in this particular spot. This leaves a transparent hole in the emulsion, which will be black in the print. These spots are termed *pin-holes.*

631. The advanced worker does not view a pin-hole or two with any great degree of consternation. He knows they are sure to occur at times, no matter how much care is taken to avoid them. One should, of course, take precautions, for prevention is far better than cure. The camera and all other apparatus, as well as the dark-room, should be in such a condition of cleanliness that there will be little or no cause for pin-holes.

632. **Keeping Apparatus Clean.**—The interior of the camera should be dusted out occasionally with a damp cloth, or one slightly moistened with glycerine. Care must be taken, of course, not to leave the instrument damp. The glycerine will, therefore, be a more satisfactory medium to employ than water. The glycerine will also pick up many particles which the dampened rag would leave untouched. Plate-holders, changing-boxes, or roll-holders should also be carefully dusted. When inserting the plate in the holder, and withdrawing or inserting the slide, there will be danger of dislodging particles of dust and causing them to adhere to the sensitive surface of the plate if the holder and slides were not thoroughly dusted.

633. The folding types of cameras have ventilation apertures at the corners of the ground-glass, so when focusing the air may be drawn in or squeezed out. The focusing-magazine type of cameras, however, are not so ventilated, and when focusing them the air finds its way through minute holes with considerable force. These small, but powerful, currents of air stir up whatever dust may be present, and the particles are bound to locate on the surface of the plate.

634. The careful dusting of all plates is to be commended, but unless this is done slowly you are apt to electrify the film and cause more dust to collect than you remove. The conscientious worker is always extremely particular regarding the dusting of a plate, but the practical worker may not even possess a dusting brush for this purpose, knowing full well that dusting a plate may easily put more dust on it than it removes. It is sometimes recommended that the dust be blown off of the plate, but this is not advisable, as particles of moisture are very likely to be blown from the lips on to the plate. The most effective method is to simply give the edge of the plate a sharp tap on the bench or shelf, holding the plate at one end and striking the wooden shelf with the plate, meeting the surface at right angles. Any particles of dust which could be removed by means of a brush will be dislodged by this knock.

635. The brush very easily electrifies the surface of the film and very often causes dust in the atmosphere, as well as any particles that may be on the brush itself, to adhere to its surface. After all, when the plate is taken from the box there is very little danger of there being any dust on it, for the plates have been handled in a perfectly clean room at the factory and packed in absolutely dust-proof boxes.

636. **Air-Bells.**—Dusting before development with a brush is usually valueless, and the practical worker seldom performs this operation. Air-bells are much more likely to occur than pin-holes, during development, and these may al-

ways be known by their slightly larger size and by their roundness. The air-bells are caused either by previous wetting of the plate or the careless pouring on of developer. They keep the developing solution from acting on the exposed surface, and as the silver salts are not then affected by the developing agent this spot will fix out in the Hypo, leaving a perfectly round transparent hole.

637. **Spotting with Ink.**—The preceding suggestions are intended for those who are particularly interested in the making of negatives. If it has not been possible to avoid the pin-holes or air-bells, the simplest remedy, and perhaps the quickest method of all, is to use a fine sable brush and some opaque color, and touch each pin-hole, making it a black or opaque spot instead of a white or transparent one. The transparent spots print black on the paper and cannot be removed without considerable effort, at least. The opaque spot, however, prints white, which gives you a chance to remove it by either again employing the brush and color, or the pencil, working it up until it matches the adjacent tint in tone.

638. You should not strive to fill up the holes solid, however, for this will necessitate hand-work on each and every print that is made from that particular negative. As much work should be avoided as possible, and the pin-holes or air-bells should be made to blend and match the surrounding tint. Small fine dots will break up the imperfection and permit it to print exactly the same as the adjacent tint.

639. There are specially prepared spotting colors, but a stick of India ink will answer every purpose. As black matches very well with the metallic silver of the emulsion, it is advisable to use the India ink. A little may be rubbed upon your thumb nail or on a piece of glass (which has been previously moistened) until the nail or glass is quite well charged. Allow this to dry before attempting to use it; it will take but a minute or so. Slightly moisten with the lips a very thin pointed brush, the smallest size obtainable, and rub on the India ink until you have a

slight deposit on the brush. Apply the tip of the brush to the spot and if it is very small it will be removed with one touch.

640. If the opaque mixture in the brush is thin the film will absorb the water color and the hole will be unfilled, the color forming a ring around it. On the other hand, should the color be thick, a tiny touch will deposit the color and it will stay exactly where applied. Only the point of the brush must be used, and it should be kept at right angles to the surface of the negative. If the imperfections are quite large, such as air-bells and where the hole does not go through to the glass, the solution in the brush may be much thinner, but it should be applied to the negative in tiny spots, giving a stipple effect.

641. When attempting to remove large transparent portions, the ink should be applied first very lightly, and with the ink diluted in color, so as to simply give a coating over the surface, after which it will be possible to apply a heavier ink and have it adhere to the emulsion. Should too much ink be applied to any portion it may be easily removed by scraping very carefully with the etching knife. You must, however, be very careful when applying the etching knife to remove any surplus ink, that the film is not wet, as there would be immediate danger of pulling the film from the glass in the wet spot. A general rule for spotting the negative with a brush is not to have the ink too wet, and not to lift the brush from the film too quickly. Let it remain in contact with the film for a second or so, and thus give the ink an opportunity to soak into the film a trifle.

642. **Spotting with the Pencil.**—Frequently there will be numerous very small spots. These may be much more effectively removed by touching them out with a finely pointed retouching pencil. A little retouching dope must be thinly applied to the film and when dry, a BB pencil, which has been properly sharpened (the same as for regular retouching), is held vertically to the negative and placed exactly on the pin-hole. Then rotate it between the finger

and thumb for perhaps a quarter turn. With a little practice you will soon be able to do the greater part of the spotting and filling in of pin-holes with the pencil. At first the point may break occasionally, or enough of the lead may not adhere to the film, but with a little patience and practice you will be able to apply the lead so it will blend nicely.

643. There are times when the sky portion of a negative shows an infinite number of pin-holes. There are probably just as many in other parts of the picture, but they only show prominently in the more opaque portions. The larger ones may be touched out by one of the methods just given, but it will be practically impossible to touch out all of them. If fairly rough printing paper is used the minute holes will not show, while if a smooth or glossy paper is to be employed a thin sheet of celluloid may be interposed between the negative and the paper, which will be sufficient to destroy the sharpness of the pin-hole, yet not enough to seriously impair the definition of the picture. If enlarging from such a negative the same thing may be effected by very, very slightly throwing the image out of focus.

644. Where air-bells and large transparent spots prevail the negative should be coated with retouching dope and the imperfections removed by using a very soft retouching pencil, such as a BB lead. A stroke similar to a comma is usually the best to employ, as it will fill up, and at the same time cause a looseness or texture to be formed. The amount of looseness which one should aim to produce will depend entirely upon the nature of the surrounding tint.

645. **When Not to Spot.**—Unless your touch is delicate it may be advisable to refrain from any serious attempt at spotting minute dust specks, for they may be made far more conspicuous by overwork. Many times specks will show to a far greater extent on the negative than on the print. Especially is this the case with black backgrounds, and it is advisable to allow them to remain as they will not appear conspicuous on a black ground. Of course, where they appear on the high-lights on the face they

will need to be removed and usually this can be done with the retouching pencil.

646. A proof should be made to see the result of your work. If too much spotting ink is applied to the negative it may be removed by washing the surface gently with wet cotton, but this must be done all over the film surface, or streaks will be left. Pencil spots can be removed by wiping off the retouching medium with turpentine, gasoline, or alcohol, whichever one is the solvent of the medium employed.

647. **Spotting Prints.**—Black spots on the negative cause white spots on the print, for they keep the light from acting upon the sensitive silver in the emulsion of the paper. These must be removed by spotting. The method of applying the spotting ink to the print is exactly the same as that for spotting the negative. The same brush may be employed, and also the same black India ink, which latter must be blended by dilution to match the color of the print. There is one difference, however, between the spotting of prints and the spotting of negatives: A more opaque color may be employed for spotting negatives than for spotting prints.

648. When spotting prints the end of the stick of opaque should be moistened and rubbed over a small surface of glass plate; then with the brush well moistened with saliva, or by dipping it into a tumbler of clean water, thin down the ink to about one-third its original density; then charging the brush with the diluted opaque apply it with the tip of the brush to the spot to be eliminated. Of course the density of the surroundings determines the density of the ink to use. If, for example, the surrounding portions are light gray, the ink must be reduced to this color; if quite dark, a stronger color may be employed, but even then, owing to the fact that the paper readily absorbs the ink and it is quite difficult to remove a surplus amount, it is far better to apply a very diluted color a number of times than to have too much ink adhere and then necessitate removing with the etching knife.

649. A practical way of blending the ink for use would be as follows: Apply the moistened end of the stick of opaque to a small piece of glass or a regular pallet, or on a porcelain water color slab, and then gradually thin out toward one edge. A drop of water should then be placed on one corner of the glass plate or pallet, and the tip of the brush dipped into it. Then very carefully rub the brush on the lightened portion of the ink—just a sufficient amount to get a little of the ink on the tip. Now, by twirling the brush between the thumb and finger gradually draw it away from the ink and remove as much of the surplus quantity as possible. The tip of the brush may then be touched to the white spot very carefully. If one application does not remove the imperfection repeat the operation until you have blended the white spot to match the surrounding tint.

650. A more convenient method, and one employed by the majority of retouchers when spotting, is to moisten the brush on the tongue or between the lips and then touch the brush to the ink and remove any surplus quantity by again placing the brush between the tongue and lips. A little practice with this method will enable you to secure the exact quantity of ink on the brush to properly remove the imperfection on the print. After a few trials you will realize how very little of the ink is required, except in the spots that come in the deepest shadows.

651. There should be no white spots in shadows, however, if the negative itself has been properly spotted and any opaque portions removed with the etcher, but should there be any white spots on the print in the deep shadows, they may be easily removed by using a stronger charge of the ink in the brush. A little practice will soon enable you to govern the correct amount of ink to have on the brush when removing spots of different tones on the print.

652. The spots in the sky, on faces, and on conspicuous portions of high-lights, require spotting out on the negative. If, for any reason, the spotting is carried too far here, a certain amount of spotting will be required on

the print, but the merest trace of color will invariably do what is required.

653. The greatest fault in the spotting of a print is a bad match between the tone of the print and the ink. Gaslight prints, platinums, and all other cold tone papers may be spotted with the regular India ink and the tone between the spotting and the print itself match perfectly, for all will depend upon the amount of dilution of the ink to match the tone of the print. Prints should not be spotted by artificial light, for no matter how good the match may seem to be at the time, you will be sure to find the spots very conspicuous when you look at your work by daylight. In spotting ordinary black and white prints, also negatives, one of the best substitutes for the India ink is a preparation manufactured by F. Weber & Co., No. 1125 Chestnut Street, Philadelphia, Pa. They have a liquid black No. 3, which may be diluted slightly with water and applied to a small piece of glass or porcelain, and used in exactly the same manner as previously directed for working with the regular India ink.

654. **Spotting Sepia Prints.**—Selecting the proper tint for the spotting of sepia prints is the most important point to consider. The average sepia print, however, may be matched most successfully with the brown No. 2, as manufactured by F. Weber & Co. This color comes in paste form, in tubes costing 25 cents each.

655. Care must be taken that the brush is at all times perfectly pointed, and that no stray hairs protrude to touch the print in spots where you do not intend to deposit any color. By twisting or twirling the brush when removing it from the color pigment, you will very easily secure a fine point to it. The tip of the brush only should be touched to the print, and fine dots, forming a stipple, will be found the most satisfactory ones to remove the imperfection. Thin lines may be removed by using a stroke of the brush in the direction the line runs.

656. Not only is it essential that you match the color, but you must match the surface of the paper also. You will

experience no difficulty with matte surface papers, but with a glossy print a spot of ordinary water color or India ink, no matter how perfectly it matches in color, will be very conspicuous. The simplest method of preventing this is to moisten the brush with a solution of gum arabic before applying it to the spotting color.

657. Making the pin-holes or air-bells on the negative perfectly opaque and then, in turn, spotting the print, is not much trouble when the number of prints to be made are few; but a great deal of time will be saved when many prints are to be made, if the imperfection on the negative is very carefully spotted with a stipple, which will cause the transparent portion to perfectly match with the surrounding tint. If you find this difficult to do with the brush and ink, you may resort to a very soft retouching pencil. The pencil must always be very pointed, as an ordinary blunt point would be of practically no use for successful work.

658. **Spotting Carbons.**—In the case of carbon prints it is best to make your own spotting medium by placing a few scraps of unexposed carbon tissue in cold water. When quite soft add a little hot water and dissolve the gelatin and pigment. But in this form it cannot be used, as the gelatin tends to solidify on the brush itself as it cools. If you add plenty of hot water and allow the liquid to stand for a day or two, most of the pigment will settle to the bottom of the dish, and then you may pour off the clear liquid, which contains the gelatin. The sediment can be used for spotting, and it will be found to be the best medium that you can employ, for it will exactly match the carbon tissue. Some of the manufacturers of carbon paper, especially the Autotype Company, manufacture spotting colors which will save you this trouble of preparing the pigment yourself.

659. The method of applying the color to the carbon is exactly the same as for spotting any other kind of print. If it is not possible for you to obtain the above mentioned colors, you should experience no difficulty whatever in matching the print by means of ordinary water color.

660. You should practice on discarded negatives and prints, working with the greatest amount of care, and strive in every way possible to follow the directions we have given. With a little practice no difficulty whatsoever will be experienced in removing pin-holes and air-bells from negatives, or white spots from prints, or even softening strong high-lights in the hair and drapery.

661. **Repairing Cracked and Broken Negatives.**—The breaking or cracking of a negative is not of infrequent occurrence even in the best of well-regulated studios, and usually it is the negative most wanted that gets damaged. However, a cracked negative, or even a badly broken one, is not beyond repair. There are various methods in vogue for preparing such damaged negatives for the printing-room, but we will only mention those that are of most general service.

662. **Negative Cracked, but Film Not Broken.**—With such a negative the best method is to lay the cracked negative very carefully on a clean sheet of glass made from an old negative, and to bind them together with sticking tape around the edges. Then, when printing, proceed to place the negative and paper as usual in the printing-frame, in the corners of which tacks have been driven, to which strings are attached. The ends of the strings are tied together at any distance above the negative found suitable, and the whole suspended from a cord fastened in the window. Spin the printing-frame and keep it spinning during the printing of the paper. In this way all parts of the cracked glass will be presented evenly to the light, and no sign of the crack will show in the finished print. Printing should be done in diffused light.

663. Another method: A deep cardboard, or wooden, box can be used, the printing-frame being laid on the bottom of the box, which is placed in a window in diffused light. Printing will take much longer than ordinarily, but very little signs of the crack will be visible in the print.

664. If the negative is valuable and its use may be of frequent occurrence, the film (provided it is not broken)

can be transferred to another sheet of glass entirely. To do this, first harden the negative in a 10% Formalin bath, so that the film will not expand in the subsequent process; then place some clean water in a tray, to which is added a few drops per ounce of Hydrofluoric Acid. With the point of a sharp knife cut around the film about an eighth of an inch from the edge, and then place the negative in the Hydrofluoric bath. The film will gradually come away from the glass. Keep the tray rocking slowly until the film is entirely removed; then pour away the acid bath and wash the film with clean water.

665. Next introduce into the tray a carefully cleaned piece of glass—an old, cleaned negative will do—and bring it under the film. Using a soft brush, press out all bubbles that may adhere to the glass under the film; then withdraw glass and film, holding the film to the glass at one end by the fingers. Unless the film has been hardened too much it will adhere to the glass when dry. Stand up on end to drain and dry. An ebonite or celluloid tray should be used, as Hydrofluoric Acid attacks glass or porcelain.

666. **Glass and Film Both Broken.**—Another method more frequently employed, and one that may be applied successfully even where the glass and film are both broken, is to attach the negative to a plain piece of glass, with binding tape, place it in the printing-frame and make a transparency by contact, holding the frame containing the negative and dry plate at such an angle to the light as to show as little of the crack as possible. The correct angle you can ascertain by first holding the negative to the light before placing the sensitive plate in the printing-frame. You will observe that when holding the negative at a certain angle the crack, or cracks, show less than they do when holding at other angles. After ascertaining the correct angle whereby the least appearance of the crack will show, place the sensitized plate on the negative in the printing-frame, hold it at the right angle, and expose by artificial light, holding the frame at least two feet from the source of illumination. (See Lantern-slide Making, Volume V.)

With the transparency made, whatever cracks are visible should be removed in the transparency. The transparent lines are removed with a BB retouching lead, and all opaque lines are removed with the etching knife. By this means all appearance of cracks that were visible in the negative may be almost entirely removed in the transparency. With this done make a negative from the transparency by contact. The negative should appear free from any marks whatever. If, however, any parts of the crack still appear, you may again apply similar work upon the negative, using the pencil for transparent lines and the etching knife for the more opaque ones, thus entirely eliminating all cracks and resulting in a perfect negative.

667. **Torn Film on Negative.**—Where the film has been torn away from the glass by careless manipulation during development, fixing or washing, it can be repaired by carefully laying the torn film back in place with a soft brush while the negative is still in the water. Remove it at once and dry it. Then retouch the negative and spot the print in the usual way.

668. Where the film has been torn out entirely, it is best to flow a little collodion or gelatin on the place, as it is almost impossible to apply pencil or color to the glass itself. With a gelatin or collodion surface on which to work, carefully penciling or applying of India ink will remove most of the signs of the tear. It is best to pencil or color the torn place a little darker than the surrounding film, and the print can then be brought up to the proper color afterward.

669. In applying color or India ink to a large spot or a long one, never apply it all over the spot, but apply the color to the center. It will gradually spread to the edges of the spot and fill up the opening, whereas if the color is applied working from the film to the center of the spot, the film will attract all the color, making it impossible to cover the hole.

CHAPTER XLII.

Practical Studio Retouching.

670. **Introduction.**—It is necessary that the fundamental principles of retouching, etching and modeling be thoroughly understood, and that you become capable of applying these with precision and accuracy before you can consider yourself a competent retoucher. The preceding lessons have been arranged so as to gradually train one to master each of these principles in their proper order. If the instruction has been carefully followed out and the practice work given its due amount of attention, you should now thoroughly understand the art of retouching. But, even though all of this is clear to you, if you lack *practice* you are far from the goal.

671. Each and every lesson must receive its full amount of attention and nothing in it slighted. It is only by practice that you can expect to master the individual lesson, and until mastered you should refrain from working on a following one. There are times, however, after diligently applying yourself to a certain lesson, that the work will become monotonous and tiresome. By changing, taking up the next following lesson, which will be along new lines, you will become rested, and later may return to the former lesson, when the work will appear easier to you.

672. Retouching cannot be hurried and we would again most emphatically impress upon you the importance of practicing as much as possible. When you have fifteen or twenty minutes to spare, sit down to the retouching desk and work on a negative, if only in a general way, but always carry out the general principles and have a system

of working. It is not advisable to proceed in a hit or miss way. Secure cast-off negatives from some studio, if it is not convenient to make them yourself. The heads of these negatives should not be less than two inches in diameter, as this size of head is far more easy to retouch. As you cannot control your strokes as well at the start, you will find it a much simpler task to remove the imperfections on the negative of larger heads.

673. It is best to work on negatives of one particular style of lighting before attempting to retouch any other lighting effects. After having a fair idea of what is required on this class of negatives, secure those having heads posed in different ways and showing a variety of lightings. Negatives of this kind will acquaint you with the requirements of general studio work.

674. Before attempting to retouch a negative you should study it and note exactly what is to be done. The commercial retoucher should be able to read the negative very quickly and ascertain exactly what retouching, etching and modeling is required. It is not necessary for him to proof the negative, as he knows what will be the result of each stroke of the pencil or of the knife. If, however, you are not able to judge your negative in this way, you should still make proofs before attempting to retouch the plate.

675. After you have proofed the negative or examined it and ascertained what is to be done, proceed first with the etching, correcting and reducing all high-lights of the neck and drapery, outlining the figure, and removing any superfluous prominences in the outline. In fact, do all that is necessary to do with the etcher. When this is accomplished, take some of the reducing paste on the tip of your finger and rub over the large portions which have been etched. This will smooth them up and remove grittiness. The reducing paste may be applied to all large spaces worked over with the knife, so when retouching those parts the pencil will not follow the grain produced by the knife, but the surface will have an even tooth throughout. Of course the reducing paste cannot be applied to small

parts, such as straight lines, etc., as you would be liable to spread the reduction to other portions than those you desire to reduce.

676. After all the high-lights have been reduced apply the retouching dope. The extreme highest point of light on the negative being quite opaque there will be but very little work on it, other than the blending of any blemish that may exist, yet you should always begin the retouching work at the highest point of light on the forehead. Proceed in a systematic manner to retouch the various features in accordance with the foregoing lessons.

677. If any of the etched portions have been reduced too much with the knife, they should not be built up until you come to them in the regular order of retouching. Should you attempt to build them up before retouching the higher points of light, you will not know exactly how much retouching is required.

678. If you find it necessary to etch after having applied the retouching dope, be sure to rub those portions which have been worked upon by the etching knife very lightly with the reducing paste, as this will remove the coarse grain produced by the knife, and also supply a new tooth for the lead.

679. The blemishes and most transparent portions should be given first consideration and the lead applied to them in such a way as to break up and remove them with the least number of strokes. Do not forget, however, that too heavy a stroke, as well as too many light strokes, will cause a glaze over the surface of the negative. When this occurs it will be difficult to apply any more lead to these parts without coating the negative with retouching varnish. Remember that these blemishes must not be filled in *solid*. The imperfections must be broken up with cross strokes, so that a grain will be produced and the whole surface built up to match the surrounding tint. If you sit too close to your work you will see the strokes of the pencil, and this will cause you to fill in the imperfections solidly, When sitting at the proper distance from the negative you

get a general idea of the effect of the retouching, and a looseness is bound to result.

680. The best effect of roundness or atmosphere can only be obtained by working in a systematic way—beginning in the highest point of light and working downward. In this way you should start to work on the features which are nearest the front of the face; your stroke will be longer here, but as you gradually work away on either side, a finer and lighter stroke should be employed, as you are then working more on the side of the face. The coarsest grain should be where it naturally appears on the front of the face. In fact, you must try to carry out in your retouching the natural appearance of the subject, which is round, and not flat. Picture in your mind, to the best of your ability, the way the subject appeared under the light, and then proceed to model in a manner to carry out this effect.

681. It should be your aim in photography to truthfully represent nature as she exists. To over-retouch the portrait or to work promiscuously is not carrying out this idea. In retouching high-lights, especially where the amount of contrast between these lights and the half-tones is very slight, there is great danger of building up the half-tones too much and thus flattening out the entire surface. This principle is clearly exemplified in the forehead, where delicate half-tones surround the various high-lights. The greatest amount of modeling is to be done midway between the extreme highest point of light and the half-tone or shadow.

682. As it has been previously stated, practically no retouching is required in the highest point of light. The shadow portions and the extreme high-lights will need little more than the blemishes removed. The actual modeling and blending is done in the portions immediately surrounding the high-light; therefore, in the delicate half-tones on the forehead only the blemishes and those imperfections which stand out boldly should be removed. The greatest care must be exercised not to fill in these delicate half-tones so that they will be as opaque as the

highest point of light. This will immediately cause an entire loss of modeling, and destroy the character of the individual as expressed by this portion of the face.

683. If you begin blending in the very highest points of light, and then simply continue working down into the surrounding half-tones, following the lighting on the face, making no attempt at filling in any one portion more than another, and then proceed to the next highest point of light and work in a similar manner, there will be no danger of destroying the half-tones and flattening the forehead. If, after this is done, and then on viewing the work at a distance of, say, two feet from the negative, you observe some shadows which appear a little sunken and not blended evenly, apply a few broad strokes of the pencil and blend these lines in proper relation to the surrounding lights.

684. Although we have used the forehead as an example, the same principles hold good when working on all portions of the face, and the greatest of care must be exercised not to destroy the original modeling and gradation in the negative.

685. The extreme shadow portions should always be left until the last. Although for the beginner the retouching of these parts may at first seem difficult, the experienced worker will have no trouble in quickly removing the blemishes and doing the necessary modeling, for by experience he will work with feeling and instinctively work lighter in the shadows and with more delicate strokes of the pencil.

686. It is always advisable to have one certain system and to follow it. This, together with *practice,* has more to do than anything else with your gaining speed and being able to turn out the very best class of work in the quickest possible time.

687. Where the subject is in evening or low-neck dress, after working and modeling the face you next proceed to the retouching on the neck. The objectionable highlights on the neck should have been etched before attempting to retouch; therefore, all that is now required will be to blend and to model. Of course the outline of the neck

must not be lost sight of, and this should have been properly shaped during the process of etching. In this outlining, straight lines are to be broken and formed into curves. Angular outlines should also be curved and objectionable parts removed.

688. As previously stated, the experienced retoucher should be able to read the negative at a glance, but until you have reached this stage continue to make proofs both before attempting to work on the negative and also whenever in doubt as to the result produced by your penciling and etching. Before turning the negative over to the printer it would also be advisable to make a proof so that you may be positive whether or not your work has been satisfactorily done.

CHAPTER XLIII.

Lettering Negatives and Prints.

689. **Negatives.**—It is often desirable to place a title of some nature on negatives or prints, and to accomplish this, great care must be taken to form the letters neatly. Considerable labor will be saved if the title be placed on the negative, especially when a number of prints are to be made from it. Where only one or two prints are required the lettering may be done on the print itself. Where one has had some experience at free-hand lettering they will experience no particular difficulty in lettering or titling negatives, the only difference being that the letters must be made to read backwards. To simplify the work one might sketch the title on a piece of transparent paper and then invert the lettering and attach to the glass side of the negative and then place the negative in the retouching easel and trace the letters onto the film. This you will find a very simple method and one that is generally in use.

690. There are various mechanical methods of lettering negatives, one being the applying of an opaque ink by means of a reversed rubber-faced type. Another is the use of small opaque metallic letters, which come in outfits known as the "Titleit" outfit. These letters are fastened to the film of the negative in a reversed order, by means of a special gum which comes with the outfit. Another method is to write the title on a narrow strip of thin celluloid (perfectly clean roll film will answer the purpose) with an opaque ink, such as draftsmen's waterproof black ink. This is then fastened to the negative in a reversed position—*i. e.*, so that it reads from right to left on the negative.

691. Still another method is to write with the water-

proof black ink on transparent tissue or tracing paper, laying it over a piece of ruled white paper as a guide. A No. 1 brush should be used for applying the ink. A little retouching medium is then applied to the part of the negative where the title is to go, the title placed carefully on this space, printed side down (next to the film), and after being pressed into contact another fairly level coating of medium applied. This will make the paper less transparent. With a little practice the lettering can be done very neatly and effectively, and if the superfluous paper is trimmed off before being applied to the negative, nothing but the lettering will show on the finished print. The retouching medium must be applied with the brush, coating before and after placing the title on the negative, for by rubbing in the usual way there will be insufficient dope to make the paper properly transparent.

692. For large quantities of prints, and especially when negatives are to be used for post-card work alone, an excellent plan is to make a saturated solution of Potassium Cyanide in equal parts of Glycerine and water. Cut a very narrow strip of stout blotting paper and soak in the solution; then gently apply it to the negative at the place where the title is to be inserted. In a very short time the silver image will be dissolved or bleached, and can be fixed out by dipping into the fixing bath, leaving a strip of clear gelatin. The title may be transferred to this with the reversed rubber-faced type, or with the small letters which accompany the "Titleit" outfit.

693. **Red Prussiate Process for Titling Negatives.**—The most practical method of all, and one that is simple to execute is as follows: Write or draw the inscription desired upon a piece of good, coated paper, using a clean pen dipped in a solution of Red Prussiate of Potash (Potassium Ferricyanide). Next, lightly yet evenly, dampen, with cold water, the part of the negative (film side) you wish to letter. Then upon this moistened space lay the paper bearing the inscription. This must be done evenly and pressure applied for only a short time.

694. After carefully removing the paper the inscription will be found reversed on the film of the negative. To make the letters transparent dip the negative in a solution of Hyposulphite of Soda (half an ounce of Soda dissolved in four ounces of water). The bleaching out of the silver image where the Red Prussiate of Potash letters have been placed will take place almost immediately. Now thoroughly wash the negative.

695. Common rubber type, which can be purchased from any stationer, may be employed. Instead of using the regular stamp pad, take a piece of blotting paper and saturate it with the Ferricyanide solution. Moisten the rubber stamp on this blotter and press it firmly on the transfer paper, which latter should be applied to the negative as previously directed. The type itself suffers no harm if, immediately after being used, it is pressed several times on blotting-paper moistened with water. Clean-cut black letters will be obtained on the print if the above directions are carefully carried out.

696. **Prints.**—When the title or a signature is to be placed on the print, it is very important that more than ordinary care be exercised to have its appearance extremely neat. Many workers fail to realize the importance of these details.

697. **Purposes of a Title.**—The object of a title is to tell the subject of a print. This may seem very obvious, but a full understanding of this first point is the basis upon which all other rules are laid. The lettering must *first* be legible; *second*, appropriate, and *third*, not too conspicuous.

698. **Legibility.**—It would be far better to omit the lettering of the title if it is not done clearly and neatly. If not accomplished in this way it becomes merely an irritating, meaningless addition, rather than an assistance in understanding the picture. Many times one sees titles of this nature carelessly and unintelligently written in some conspicuous corner of the print. Attention is, of course, immediately attracted to them, but they do not enlighten the observer regarding the subject.

699. **Appropriateness.**—The style of lettering should harmonize with the print, and it is therefore necessary to give particular consideration to this feature. If the print is full of delicate tones the wording should not be in heavy, solid letters. If the title is added to a print of purely historical or scientific interest, or if the title is merely typographical, elaborate ornamental lettering is wholly out of place. It is not necessary to have fancy flaring lettering for pictorial photographs. In fact it is far better to use as plain and simple a style as possible, and the lettering must not be so conspicuous as to detract from the picture itself.

700. Careful thought must be given to the nature of the title, for it must be appropriate for the print with which it is used. The title must, to a certain extent, give an explanation of the picture. It should not, however, be too long. Two or three words is a great sufficiency, and you should aim to have the title come within this number.

701. **Restraint.**—The title must be perfectly legible and in harmony with the subject, yet it must be placed on the print with some restraint, both as to size and style. The letters should be just large and bold enough to be read at the distance from which the print is to be viewed. It is permissible, however, to have them smaller—never larger. Where the subject material is quite decorative the lettering and the title may be somewhat ornamental, but the utmost care must be exercised not to make them an object of attraction, for then they will detract from the subject itself.

702. **Lettering.**—In making black letters on the print or the mount, Higgins' Water-proof India Ink will be found the most satisfactory medium, applying it with either a No. 1 or No. 3 sable brush, the size of the brush depending upon the size of letters desired. The No. 1 brush, however, will be the most serviceable one. The plain block letter, as a rule, will be the most satisfactory one for general use. Deviations from this form may be made to suit the individual.

703. If you wish to produce **white letters** on a black ground, prepare the following ink:

Iodine	2 grs.
Potassium Iodide	10 grs.
Gum Arabic	30 grs.
Water to make 1 ounce.	

704. Apply this to the print with a brush. It converts the silver image into silver iodide, and then by dipping the print into the fixing bath the portion covered with this ink will be dissolved, leaving a white title.

705. **Position of Title.**—When the title is to be placed on the print, or even on the mount, choose a position which will help to balance the main point of interest of the composition. For instance, if you have a profile portrait in which the chief mass of the figure falls more toward the left half of the print, write the title somewhere on the right lower half of the mount. A central position will seldom be found a satisfactory one. A favorite position is the lower right-hand corner, and unless there is some reason for placing the title in some other place, this position may be adopted for the majority of titles. Leave considerable space between the title and the margin of the print and the mount, especially if the print is to be framed.

706. Occasionally the style of a portrait and its composition is such that the name of the subject or the name of the maker is worked in faint letters on the upper part of the background. Usually a long or old-fashioned letter—not too regular—is used, and frequently the year is inserted in Roman figures. This often helps to balance the composition of a large portrait.

707. The principal requisite of good lettering is that the bottom of the letters be in a perfectly straight line. It is equally as important that the letters be all precisely the same size, and it will, therefore, be necessary to rule another line to give you the size of the capitals. Use a medium hard pencil, such as an HH lead. These three lines should be ruled very lightly. If you are only using capitals it will,

of course, be necessary to use only two lines. The capitals should *not* be twice the size of the small letters, as your lettering will then look ungainly.

708. The distance from the centers of letters should be about equal. Do not make the mistake of spacing the letters so that the adjacent parts of each letter are equally distant from the adjacent parts of its neighbor.

709. You should not attempt to ink in the letters at first. Make sure that the lettering of the title will come exactly in the space allowed to it, by sketching the letters in roughly, and as lightly as possible, with a B or BB pencil. If any errors should occur the letters may be lightly rubbed out with a soft rubber eraser, without erasing the guide lines, which latter should have been drawn with a harder lead (HH).

710. When you have gotten the letters approximately correct with the pencil, proceed to ink them in, striving to improve their shape and the spacing upon the rough penciling beneath.

711. Do not attempt to make the lines with long single strokes. Each line should be sketched in little by little. It requires a very steady hand, good judgment, and some little practice, to outline a letter perfectly with a single stroke. For certain fancy styles of letters a firm, single stroke may result in beautiful effects, but such styles belong to the skilled draftsman, and they are only artistic when complete control of the hand is obtained.

712. If desired, various colors of inks may be used, yet sepia and the ivory black India ink will be the two most used colors—the sepia ink for sepia prints, and the India ink for those of colder tones.

713. **Practice.**—Considerable practice should be given to lettering before you attempt to do any serious work on the print. You need not try to rival the letter-press printer, for evidence of the pen or brush in such work as this is not at all disagreeable, but try to form the letters carefully so they will appear neat and not ragged and not show carelessness on your part.

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GENERAL INDEX

TO

COMPLETE SELF-INSTRUCTING LIBRARY

OF

PRACTICAL PHOTOGRAPHY.

ENCYCLOPEDIC DICTIONARY AND GLOSSARY OF PHOTOGRAPHIC AND CHEMICAL TERMS.

The Roman numerals refer to Volume. The number following refers to paragraphs in all cases, excepting where the word "Page" precedes the number. When a subject is exhaustively treated upon in a volume, simply the volume number is given; reference should then be made to the index of that volume, where the page or paragraph numbers for the various sub-divisions of the subject will be found. Our authority for chemicals, symbols, description and solubility of chemicals given herein is based entirely upon **MERCK'S CHEMICAL INDEX.**

A

Aberration—VI, 582–585.

A defect in a lens causing it to render a distorted image, and one lacking sharpness. (*See* **Lens Tests.**)

Aberration, Chromatic—VI, 582, 583.

Caused by the different color rays of light coming to a focus in different planes. A defect found in all lenses, formed of a single piece of glass. (*See* **Lens Tests.**)

Aberration, Spherical—VI, 584, 585.

Caused by the rays of light refracted by the margin of the lens meeting at a different point in the axis than those rays that are refracted from the center. This defect occurs prin-

cipally in the single lenses. May be modified by using a suitable stop, or diaphragm, which cuts off the marginal rays of light. (*See* **Lens Tests.**)

Abrasion Marks—IV, 764; **IX,** 811.

Black lines and markings on the surface of prints due to pressure on the gelatin film and, especially, scratching against the edges and corners of other pieces of paper, when taking from package. Easily removed by rubbing the dry print with alcohol.

Accelerator—II, 25.

A chemical used in a developer to quicken its action in bringing out the latent image. *Example*: Sodium, or potassium, carbonate.

Accessories—I, 639; **VI,** 182, 391–393; **VII.**

A term applied to apparatus, and especially to chairs, scenery, etc., in the studio.

Acetone—$(CH_3)_2CO$—II, 577, 583, 588, 597.

Clear, colorless liquid; fragrant, mint-like odor; sharp, biting taste. Mixes easily with water, alcohol and ether. Is very inflammable, therefore must be kept away from the flame. Readily dissolves fats, resins, camphor, celluloid, etc. In combination with other solvents it is used in the preparation of varnish for negatives. Within recent years it has been brought into use as an accelerator, in which connection the gelatin film is neither colored nor altered, neither does it tend to soften the sensitive film. This latter property is of particular interest to those working in warm climates. When acetone is employed the dark-room must be well ventilated, or it will produce violent headache.

Acetone Sulphite.

White, floury, granular powder. Readily soluble in water. Keeps well. *Used* in developers and fixing baths as a preservative, taking the place of sodium sulphite, etc. It exercises a restraining action in the developer. Can be used as a blackening agent for intensification with chloride of mercury. It is unlike acetone, as it is not sufficient in itself to make a developer active.

Acetylene.

A colorless gas burning with a bright flame. Produced by action of water on calcium carbide. It makes an excellent illuminant for enlarging, etc. It is poisonous, and explosive when mixed with air.

Achromatic Lens.

(*See* **Lens, Achromatic.**)

Acid—IV, 55, 242.

A sour substance. Chemically, it is a compound containing one or more atoms of hydrogen. Turns blue vegetable colors to red. Just the opposite in action to alkalies. *Acids used in photography are treated under their respective headings, as follows:*

Acid Acetic—$C_2H_4O_2$—IV, 701.

Strongly acid liquid; sharp acetic odor. Should be kept in a stoppered bottle. Sold in various strengths, the strongest being known as *glacial acetic acid. Used* to acidify developer in wet plate process; in silver intensification to delay deposit of silver; in uranium toning to prevent any trace of alkalinity; etc.

Acid Acetic—Commercial—No. 8—25%.

A diluted form of acetic acid (therefore of weaker strength). This strength of acetic acid is in most common use in photography, and having a strength of 25% it contains one part of glacial acetic acid to four parts of water.

Acid Acetic—Glacial—99½%.

Term applied to the pure acetic acid.

Acid Boric—H_3BO_3.

Colorless crystals; pearly luster; slightly unctuous to touch; odorless; faint, bitterish-acid taste. *Soluble* in 18 parts water, 15.3 parts alcohol, 3 parts boiling water, and 4.3 parts boiling alcohol.

Acid Carbolic—C_6H_6O.

Colorless crystals; characteristic odor; when highly diluted has sweetish taste. Deliquescent in moist air. *Soluble* in alcohol, ether, chloroform and glycerine; in about 20 parts water; in 2 parts olive oil. *Used* principally for disinfecting solutions or mixtures. Keep in dark amber, well-stoppered bottles.

Acid Carbonic—CO_2—IV, 249.

Carbon Dioxide.

Highly volatile, colorless liquid. *Soluble* in cold water. Is used but little in photography, the photographer coming in contact with it mostly in water. A test for its presence in water is given in the above reference.

Acid Chromic—CrO_3.

Chromium Trioxide.

Reddish-brown, needle-shaped crystals. Keeps well in glass stoppered bottle. *Soluble* in water. *Used* sometimes in place of potassium bichloride.

Acid Citric—$C_6H_8O_7 + H_2O$—**IV,** 153, 154.

Colorless, rhombic crystals, or white powder; odorless; very acid; permanent in dry air at ordinary temperature. Efflorescent in warm air, deliquescent in moist air. *Soluble* in water, alcohol and ether. The crystalline form of this chemical is preferable for photographic work. *Used* as a preservative in solutions of pyro, also to acidify wet plate developer and silver intensifier. Employed in alum clearing solution and in solution "F" in the autochrome process.

Acid Fixing Bath—I, 204, 205; **II; IV; V.**

A normal *hypo* bath to which has been added an acid and other chemicals to prevent formation of developer stain; also to act as a hardening solution. The index for Volume II refers to various formulæ.

Acid Gallic—$C_7H_6O_5 + H_2O$.

Colorless or slightly yellowish, silky, interlaced needles; odorless; astringent, slightly acidulous taste. Permanent in air. *Soluble* in 5 parts alcohol, 40 parts ether, 12 parts glycerin, and about 100 parts water. *Used* in various early processes as a developer, especially for paper negatives and also in the callotype process.

Acid Hydrochloric—HCl—**IV,** 552.

Muriatic Acid or Spirits of Salt.

Clear, colorless, pungent, fuming liquid; strongly acid; unpleasant smell. Should be kept in a glass stoppered bottle. In its impure form it is yellow in color—should be used only for cleaning dishes. In making up solutions use *only* the colorless, *chemically pure liquid.* **Poisonous.** Antidote: bicarbonate of soda and water. In case of an emergency, scrape ordinary plaster from the wall and mix with water. *Used* principally for clearing platinum prints, or freeing them of the iron salts. Citric acid may be substituted, but is more expensive.

Acid Hydrofluoric—HF—**II.**

Colorless, or almost colorless, mobile, fuming, corrosive liquid. **Poisonous.** It attacks almost everything—especially glass. Therefore, must be kept in glazed dishes. Use in lead or

gutta-percha dishes. *Used* principally for stripping negatives, as it attacks the glass underneath the film, thus loosening the latter sufficiently to enable its being removed.

FORMULA FOR STRIPPING NEGATIVES.

The negative should be first well hardened in

Formalin .....½ oz.
Water .....8 ozs.

and then rinsed and put into the following dilute hydrofluoric acid:

Hydrofluoric Acid .....25 drops
Water .....5 ozs.

Do not measure the drops, but count them into a waxen or leaden dish and add the water immediately, being careful not to inhale the fumes. Almost immediately the film will be loosened, and in about a minute it may be pushed at the edges of the glass with a match and gradually slid off the glass. Transfer it immediately to the following solution:

Wood Alcohol .....3 ozs.
Formalin .....6 drs.
Water .....4½ ozs.

Again rinse and float onto a piece of clean glass and allow to dry. Care must be exercised in handling the film, not to stretch it out of shape.

Acid Nitric—HNO_3—**II,** 46.

Transparent, colorless, fuming, suffocating, caustic, corrosive liquid; strongly acid. Must be kept in glass-stoppered bottles. **Poisonous.** Antidote same as for acid hydrochloric. *Used* as a preservative for pyro in solution; in some reducing formulæ; in dissolving metallic silver; to make silver nitrate, etc.

Acid Oxalic—$H_2C_2O_4 + 2H_2O$.

Colorless, odorless, crystals; very acid taste. *Soluble* in 10 parts cold, 3 parts boiling, water; 2.5 parts alcohol; about 100 parts ether. Keeps well in corked bottle. **Poisonous.** *Used* in platinum process to acidify developing solutions; also in preparation of platinum emulsions. May be used to remove ink stains.

Acid Phosphoric—H_3PO_4—**IV,** 151.

Transparent, deliquescent, colorless prisms; odorless; very acid taste. **Poisonous** and corrosive. *Used* in making up platinum toning bath for printing-out and salted papers.

Acid Picric—$C_6H_3N_3O_7$—**VII,** 705.

Yellow, lustrous crystals; odorless; intensely bitter. *Soluble* in 10 parts alcohol, 6.5 parts ether, 170 parts water. **Poisonous.** *Used* for staining yellow screens, etc.

Acid Pyrogallic—$C_6H_6O_3$—**II.**

Pyrogallol, or Pyro.

Light, feathery, snow-like crystals; bitter. **Poisonous.** *Soluble* in 1.6 parts water, 1 part alcohol, and 1.1 parts ether. Very soluble in boiling water and boiling alcohol. The most widely used developer for dry plates. In its dry form keeps almost indefinitely. So long as it is white it has not deteriorated. Does not keep well in solution. If solution is acid it may be kept a few months, if in well-stoppered bottles, but an alkaline solution spoils in an hour, or less. For this reason always acidify the water before adding the pyro.

Acid Salicylic—$C_7H_6O_3$.

Light, fine, white crystalline powder; sweet taste and acrid after-taste. *Soluble* in 2 parts ether, 2.4 parts alcohol, 60 parts glycerin, 80 parts chloroform, 450 parts water, 14 parts boiling water. It is frequently used as an antiseptic and antiputrefactive agent. *Used* as a preservative. Added to a gelatin or starchy mountant to preserve it.

Acid Short Stop Bath—IV, 714, 975, 1030.

A bath used between the developer and the fixing bath to stop action of developer on print. It also helps to avoid stain and uneven development.

Acid Sulphuric—H_2SO_4—**II.**

Oil of Vitriol.

Strongly corrosive, dense, oily liquid. Most universally used of all the acids. Has a great affinity for water, and in combining with it produces heat; therefore, care must be exercised in mixing it with water. The acid must be poured by degrees into the water, never the water into the acid, or an explosion will likely result. *Used* to acidify pyro solutions, also as a clearing bath for bromide prints developed with ferrous oxalate.

Acid Sulphurous—SO_2.

Colorless, acid liquid; suffocating sulphur odor. *Must not be confused with sulphuric acid. Used* in some developing solutions.

Acid Tannic—$C_{14}H_{10}O_9$.

Tannin.

Yellowish powder or crytalline-like, lusterless scales. *Soluble*

in 5 parts water, 2 parts alcohol. Almost insoluble in ether. *Used* chiefly in photography for hardening gelatin prints and films, but even for this purpose it is not to be recommended, as it is liable to cause a print to turn yellow in a short time.

Acid Tartaric—$C_4H_6O_6$.

Colorless, transparent crystals or white powder; strongly acid taste. *Soluble* in about 1 part water, 3 parts alcohol, 5 parts glycerin, and slightly soluble in ether. *Used* in preserving emulsions containing silver nitrate in various sensitized papers.

Acid Water, Effects of—IV, 237-242.

All water should be tested before use. In most instances, if acid, it should be neutralized. (*See* Reference.)

Actinic.

A chemical property of light. Causes chemicals to combine and decompose. White light is *actinic.* Violet, indigo and blue rays are the most *actinic,* therefore are called actinic rays, while the red, orange and yellow rays are known as non-actinic rays of light.

Actinometer—I, 640–646; **V.**

An instrument used for measuring the *actinic* power of light, and especially valuable for measuring the necessary exposure for plates and papers.

Adapter for Lenses.

A brass ring having screw threads which permit of lenses being fitted into other flanges than those for which they were intended.

Adurol—$C_6H_3Cl\ (OH)_2$ or $C_6H_3Br\ (OH)_2$—**II,** 435-438.

A developing agent produced by substituting for an atom of hydrogen in hydroquinon one atom of chlorine or bromide. Adurol is far more soluble than hydroquinon, possesses better keeping qualities, tends to give less contrast to the developed negative, and does not cause stains as readily.

Advertising, Studio—VIII.

Aërial Perspective.

(*See* **Perspective, Aërial.**)

Agar-Agar.

Long, transparent strips resembling goose-quill pith; also quadrangular translucent cakes of about 10 Gm. each. *Soluble* in hot water, forming a viscid, tasteless, odorless jelly. A substance prepared from certain species of sea-weeds, which

latter are obtainable in the Pacific and Indian Oceans and Japan Sea. *Suggested* as a substitute for gelatin in dry plate emulsions, but is not so satisfactory.

Agent—II, 457-459.

That which possesses the power of acting or producing effects upon anything else. Pyro is a developing *agent;* Hypo is a fixing *agent,* etc.

Air-Bells.

Particles or bubbles of air between surface of plate, or paper, and solution. Caused by air in the water, or by splashing solution onto plate or paper instead of pouring it on with a quick, even sweep.

Air-Brush.

An instrument used by artists for finishing enlargements, and for working up various kinds of prints. Compressed air is employed to force a fine spray of ink or color onto the print.

Albumen.

An organic substance found principally in the white of an egg. Quickly decomposes. Ammonia is employed as a preservative. Used in sensitizing paper, to which it gives a peculiar and characteristic gloss.

Albumenized Paper.

(*See* **Paper, Albumenized.**)

Albumenizing—V.

The process of coating either plates or papers with a solution of albumen.

Alcohol—C_2H_5OH.

Ethyl Alcohol, or Spirits of Wine.

Colorless, volatile, inflammable liquid; burning taste. Its uses are many. *Used* as a solvent for pyroxyline in the collodion process. Used in the developing solution to make it flow more evenly. Many varnishes are compounded with it. As it takes up water readily it is used for rapidly drying plates, papers, etc. *Absolute alcohol,* which is 100% pure, is practically unavailable for photographic use. 95% alcohol, also known as *rectified spirit,* is the best to employ.

TEST FOR PURITY.

To test its purity the 95% alcohol should burn with a perfectly blue flame. If water is present to any degree, even if it were 93% pure, the edges of the flame will be a trifle red,

and the more water present in the alcohol the redder will be the flame.

Alcohol—Methylated Spirits.

Strong alcohol, to which has been added 10% of wood alcohol.

Alcohol, Methylic—CH_4O—**X.**

Wood Alcohol, or Naphtha.

Prepared by the dry distillation of wood. *Used* as a solvent for various colors, which dissolve better in it than in ordinary alcohol. Used on a tuft of cotton to reduce images or fogged portions of negatives. Applied with cotton to white parts of gaslight prints it will remove black streaks or lines (abrasion marks) and mealy effects.

Alcohol, Wood.

(*See* **Alcohol, Methylic.**)

Alkali—I, 278; **II,** Page 32; **IV.**

The direct opposite of an acid. A term often applied to an accelerator. Turns red litmus paper blue. Alkalies have the power of neutralizing acids. Strong solution of alkalies should be handled with care as they act powerfully on the skin.

Alkalies, Equivalent Quantities of.

For practical purposes the equivalent proportions of different alkalies are as follows:

Potassium Carbonate	165 parts
Sodium Carbonate (crystals)	268 parts
Caustic Soda	80 parts
Caustic Potash	112 parts

So far as the acetates, carbonates and phosphates of either potassium or sodium are concerned, there is but little or no difference in their action in the toning bath.

Alum—$Al_2K_2(SO_4)_4 + 24H_2O$—**I,** 205; **II,** 288, Page 139; **IV.**

Potash Alum, or Aluminum and Potassium Sulphate.

Large, colorless crystals or very fine, white powder. Astringent taste, acid reaction. *Soluble* in glycerin, 9 parts water, 0.3 parts boiling water. Insoluble in alcohol. *Used* in solutions for hardening gelatin films and preventing frilling; also for clearing and removing stains.

Alum, Chrome—$Cr_2K_2(SO_4)_4 + 24H_2O$—**V.**

Chromium and Potassium Sulphate.

Dark violet-red, regular crystals; ruby-red by transmitted light.

Soluble in water. Stronger in action than ordinary, or potash, alum. *Useful* for most all the purposes of ordinary alum.

Alum Fixing Bath for P. O. P.—IV, 108, 109.

Aluminum—Al.

Tin-white, malleable, ductile metal capable of taking brilliant polish. One of the lightest of the metals. *Soluble* in mineral acids and strong alkaline solutions. *Used* for camera fittings and lens mounts; also in powdered form in the composition of some flashlight mixtures.

Aluminum, Black Varnish for.

(*See* **Varnish.**)

Aluminum Chloride—$Al_2Cl_6 + 12H_2O$.

Yellowish-white, granular, crystalline powder. *Soluble* in water, alcohol and ether. *Used* sometimes for toning gelatino-chloride prints; also employed in some of the modern color photography processes.

Aluminum, To Clean.

Polished parts can be cleaned best with black "bottled" India rubber, not vulcanized. When possible, however, wash in:

Caustic Soda	1 dr.
Water	10 ozs.

Then rinse in clean water and dry quickly. The best way to dry is to shake the aluminum in a box of hot, dry, hardwood sawdust.

Amateur.

(*See* **Photographer, Amateur.**)

Amber.

A mineralized pale-yellow, sometimes reddish or brownish, resin of extinct pine trees, found in greatest abundance on the shores of the Baltic, where it is thrown up by the sea. It is a hard, translucent, brittle substance. *Soluble* in benzole or chloroform. *Used* in making various varnishes.

Ambrotype.

A wet collodion positive backed with black varnish. (*See* **Ferrotype.**)

Amidol—$C_6H_8N_2O + 2HCl$—**II,** 460, Page 364; **IV,** 1034; **V,** 671, 672; **VIII.**

Diamidophenol Hydrochloride; or Diamidophenol.

Grayish-white crystals. *Soluble* in water; slightly soluble in alcohol. *Used* as a developing agent, and is especially valuable as a bromide paper developer.

Amidophenol—C_6H_7NO.

Para-amidophenol.

Crystalline powder. *Soluble* in water and alcohol; darkens on exposure to light. *Used* as a developing agent.

Ammonia—NH_3.

Aqua Ammonia, Liquor Ammonia, Spirits of Hartshorn or Spirits of Ammonia.

Colorless, inflammable liquid; stringent, suffocating, odor of ammonia. *Used* as an alkali or accelerator with pyro. May be used for fixing prints. Employed in some dry-plate emulsions. (*See* **Ammonia Water.**)

Ammonia Developing—II, 439-447.

Ammonia Water—$NH_3 + H_2O$.

The aqueous solution of ammonia gas is a clear, colorless liquid, the specific gravity of which decreases as the ammonia content increases. For analytical purposes two solutions of different concentrations are ordinarily used, of which one has a specific gravity of about 0.96, and contains about 10% of NH_3, while the other, the concentrated, has a specific gravity of about 0.925, and contains about 20% of NH_3. In American laboratories a still more concentrated solution of ammonia is employed. Its strength is about 28%, and it is generally designated as *stronger ammonia water.* The 20% ammonia water is termed *concentrated ammonia water.*—(*Merck's Chemical Reagents.*)

Ammonium Bichromate—$(NH_4)_2\ Cr_2O_7$—**V.**

Ammonium Dichromate.

Orange-colored crystals. *Soluble* in water. *Used* sometimes in place of potassium bichromate for sensitizing carbon tissue. Is more sensitive to light than potassium bichromate.

Ammonium Bromide—NH_4Br—**II.**

White, crystalline powder, or colorless crystals; pungent, saline taste. *Soluble* in water and alcohol. *Used* as a restrainer in various developing solutions.

Ammonium Carbonate—$(NH_4)\ HCO_3\ (NH_4)\ NH_2CO_2$.

Sal Volatile, or Smelling Salts.

The term *ammonium carbonate* is generally applied to a mixture of ammonium bicarbonate and carbonate. White, crystalline, translucent masses which readily effloresce, become opaque, and give off an odor of ammonia; sharp, saline taste. *Soluble* in 5 parts water; partly soluble in alcohol. May be

used in developers, but not so suitable as ammonia. Can be used instead of ammonia for fuming albumen paper.

Ammonium Chloride—NH_4Cl—**II.**

Sal Ammoniac, or Muriate of Ammonia.

White, crystalline powder; odorless; cool, saline taste. *Soluble* in 3 parts water. *Used* in preparing albumen paper, also in chloride emulsions.

Ammonium Dichromate.

(*See* **Ammonium Bichromate.**)

Ammonium Iodide—NH_4I—**II.**

White to yellowish-white, crystalline powder; odorless; sharp, saline taste; unstable. *Soluble* in 0.6 parts water, and 9 parts alcohol. *Used* in preparing sensitized collodion.

Ammonium Nitrate—NH_4NO_3.

Colorless crystals; usually long, thin, rhombic prisms; deliquescent; odorless; sharp, bitter taste. *Soluble* in 0.5 parts water, 20 parts alcohol. *Used,* with the addition of water, to keep solutions cool in hot weather, the dish containing them being placed in a larger one filled with moistened ammonium nitrate.

Ammonium Oxalate—$(NH_4)_2\ C_2O_4 + H_2O$.

Colorless crystals. *Soluble* in 25 parts water. *Used* in some formulæ for sensitizing platinum paper.

Ammonium Persulphate—$(NH_4)_2S_2O_8$—**II,** 277; **VIII.**

Colorless crystals resembling ordinary table salt. *Soluble* in water. *Used* as a reducer for hard, chalky negatives, as it acts on the dense portions to a greater extent than on the shadow or thin portions.

Ammonium Sulphide—$(NH_4)HS$.

Ammonium Sulphydrate, or Sulphuret of Ammonia.

Colorless, crystalline masses; turning rapidly yellow on exposure to air. *Soluble* in water. *Used* as a blackening agent with both the lead nitrate intensifier and the mercuric chloride intensifier. It is usually prepared in solutions by passing hydrogen sulphide into ammonia water. It is strongly alkaline toward litmus paper.

Ammonium Sulphocyanide—$(NH_4)SCN$—**IV,** 477.

Ammonium Sulphocyanate.

Colorless, deliquescent crystals. Very *soluble* in both water and alcohol. *Used* in toning baths, also in fixing solutions. Keep well stoppered.

Amyl-Acetate—$C_7H_{14}O_2$.

Colorless, transparent liquid; aromatic, ethereal odor (smells like pears). *Use*: A solvent for celluloid. Mixes with alcohol or ether, but not with water. Celluloid dissolved in amyl-acetate makes an excellent varnish; also valuable for mending celluloid dishes or articles. (*See* **Varnish, Celluloid.**)

Anastigmat Lens.

(*See* **Astigmatism; also Lens, Anastigmat.**)

Angelo Sepia Platinum Paper—IV, 621-625.

Angle, Narrow.

In photography a *narrow angle* is one embracing a view of less than 40 degrees, and is especially valuable for making artistic pictures.

Angle, Normal.

In photography a *normal angle* is one embracing a view of from 40 to 65 degrees.

Angle of Incidence—VI, 577, 578.

The *angle* formed by the line of incidence and a line drawn from the point of contact perpendicular to the plane or surface on which the incident ray or body impinges.—(*Century Dictionary.*)

Angle of Light—I, 105, 106, Page 84.

The angle at which light should fall to best illuminate subjects.

Angle of Refraction—VI, 577–579.

The angle formed by the line of refraction and a line drawn from the point of contact perpendicular to the plane or surface on which the refracted ray impinges.

Angle of View—VI.

The amount of subject shown by a lens on the ground-glass. A lens embracing an angle of about 35 degrees gives the most truthful picture, as the eye cannot take in a greater angle of view—such a lens has long focus. Exaggerated perspective always results when wide-angle lenses are used—objects in the foreground look large and out of proportion, while those more distant appear dwarfed. This distortion is only apparent, for if a picture be taken with a 4-inch lens and viewed at a distance of 4 inches from the eye, correct perspective will result.

Angle, Wide.

A term applied to certain forms of lenses so constructed as to embrace a greater amount of view than the ordinary lens

by having a very short focus in comparison to the base line of the plate. Wide-angle lenses are of value when photographing in narrow quarters, interiors, etc.

Anhydrous.

A chemical term signifying that a substance is absolutely free from water.

Aniline.

A colorless liquid. Used in preparation of aniline colors, also in orthochromatizing plates.

Animal Photography—III, 575-637.

Animals in Landscape Photographs—III, 608–611.

Antidote—II.

A substance which has the effect of counteracting poison.

Aperture—VI.

The size of the opening in the lens through which light is allowed to pass into the camera.

Aplanatic.

(*See* **Lens, Aplanatic.**)

Apochromatic.

(*See* **Lens, Apochromatic.**)

Apothecaries' Weight.

(*See* **Weight, Apothecaries'**)

Aqua Regia.

Nitro-hydrochloric Acid.

A mixture of one part nitric and two parts hydrochloric acids. Gold, platinum and many metallic compounds which do not dissolve in nitric or hydrochloric acid separately are readily soluble in *Aqua Regia.*

Aquatic Life, Photographing—III, 634.

Arabic, Gum.

(*See* **Gum Arabic.**)

Architectural Photography—I, 647–662; **III,** 1–143; **IX; X.**

Arc Light—V, 713-724.

Aristo Carbon Sepia Paper—I, 504–509.

Aristo Gold and Platinum Solutions—IV, 210-231.

Aristo Gold Paper—I, 491–503.

Aristo Lamp—VII; IX.

Aristo Platino Paper—IV, 138-231.

Aristo Platino Paper, Sepia Tones on—IV, 407-467, 476-482.

Arms and Hands, Posing—VI, 233; **VII.**

Arrowroot.

A form of starch. Chief constituent of several mountants. Used in preparing or sizing papers for various printing processes.

Art—III.

Artificial Light—I, 443; **IX.**

A term applied to all forms of light other than daylight.

Artistic Bisection of a Line—III, 226-234, Page 114.

Artistic Mounting—IV, 1232, 1233.

Artists' Proofs on Collodio Carbon Paper—IV, 325-406.

Artura Paper—IV, 957-1009.

Artura Paper—Difficulties—IV, 1010-1039.

Asphaltum.

Asphalt; Bitumen; Mineral Pitch; Judean Pitch.

A brownish-black, resinous mineral. *Soluble* in benzine, chloroform, or in turpentine. *Used* by Niepce as a coating for silver plates; employed in various varnishes and lacquers; cell-making for microscopy; etching, and various photo-mechanical processes.

Astigmatism—VI.

A defect of the pencils of light passing through the margin of a lens that renders vertical and horizontal lines unequal and not sharp; usually found in lenses corrected for flatness of field. The defect may be overcome by using a small stop. In a majority of modern lenses this defect has been done away with by the use of Jena glass and proper construction.

Astigmatism, Test for—VI.

Athletic Sports—IX.

At-Home Portraiture, Daylight, Artificial Light, etc—VI.

Atmosphere—III, 243, 244; **VI,** 206; **VII,** 62.

(*See* **Perspective, Aërial.**)

Atom.

An *atom* is the smallest particle into which an element can be divided.

Atomic Weight.
(*See* **Weight, Atomic.**)

Autochrome Plates—VIII.
(*See* **Lumière Process.**)

Automatic Shutter.
(*See* **Shutter, Automatic.**)

Autotype.
A. trade name for the carbon process.

Avoirdupois Weight.
(*See* **Weight, Avoirdupois.**)

Axis—VI.
The axis of a lens is an imaginary line passing through the center of its curve and at right-angles with its plane surface.

Axis, Principal—VI.
The principal axis of a lens is a line passing through the center of curvature of spherical surfaces and perpendicular to the plane surface; or, it may be described as a straight line passing through the optical center of a lens.

Azo Paper—IV, 868-897.

B

Baby and Child Photography—VI, 372–398; **VII.**

Back Combination.
(*See* **Lens, Back Combination.**)

Back Focus.
(*See* **Focus, Back.**)

Back, Repeating.
An attachment on the back of a camera for making a number of different exposures on one plate.

Back, Reversible—I, 67; **III,** 16.
A removable attachment at the rear of the camera, enabling one to insert the plate-holder either in an upright or horizontal position.

Back, Revolving.
An improvement on the reversing back in which the rear attachment may be changed from vertical to horizontal, or *vice versa,* without the necessity of removal.

Back, Swing—I, 84, 85; **III.**
An arrangement by which the back of the camera may be

inclined so as to place the focusing screen or plate-holder in a true vertical position when the camera is tilted. This is to avoid the distortion of lines. A SINGLE SWING BACK is one in which the swing is confined to one plane, while a DOUBLE SWING BACK is one in which the back is arranged to move upon both a horizontal and a vertical axis.

Background—III; VI; VII; VIII; IX; X.

The most remote portion of a landscape, or the space and objects behind the principal figures. In portraiture an artificial background is made of plain or painted cloth, canvas, or stout paper, fastened, for convenience, to a wooden frame on rollers.

Background, Revolving.

A form of background circular in construction, which can be revolved on a pivot until the correct light and shade effect is obtained back of the sitter.

Background, Worked-in—IV, 1191-1194; **VIII.**

The process of building on the negative or print (usually the negative) a background effect. Full instruction is given in the above reference.

Backing for Plates.

(*See* **Plates, Backing for.**)

Backing for Prints.

(*See* **Prints, Backing for.**)

Balance—III, 216; **VII,** 98–105.

(*a*) An instrument (scales) for determining the relative weights of materials. (*b*) A term used to describe an artistic combination or proportion and arrangement in a picture.

Balsam, Canada.

Balsam of Fir; Balm of Gilead (improperly); Canada Turpentine.

Yellowish, transparent, solid mass; pine-like odor; bitter taste. *Soluble* in ether, chloroform, benzene, oils, etc. *Used* for cementing lenses, attaching cover-glasses to lantern-slides, mounting microscopic objects, etc.

Barium Bromide—$BaBr_2 + 2H_2O$.

Colorless, tabular crystals. *Soluble* in water, alcohol and ether. **Poisonous.** *Used* sometimes in collodion.

Barium Chloride—$BaCl_2 + 2H_2O$.

Colorless, flat, four-sided crystals; bitter, salty taste. **Poisonous.** *Soluble* in 2.5 parts water; almost insoluble in

alcohol. *Used,* sometimes, in the preparation of sensitized papers, instead of the more commonly used chlorides.

Barium Nitrate—$Ba(NO_3)_2$.

Lustrous, colorless crystals, or white powder. **Poisonous.** Soluble in 20 parts cold, 2.8 parts boiling, water; insoluble in absolute alcohol. *Used* as a wet-plate developer together with ferrous sulphate, and serves to prevent pinholes.

Barium Sulphate—$BaSO_4$.

Heavy, white powder. *Soluble* in ammonium-nitrate solution; insoluble in water and acids. *Used* in the manufacture of transfer paper for the carbon process; also in the forming of an emulsion to coat paper.

Bas-Relief Photographs.

Prints in relief, obtained by either handwork on the back of the print while damp, or by the action of light on a thick film of bichromated gelatin, swelling it in water and from it taking a cast in plaster-of-paris.

Bath—II; IV.

A term applied to various solutions in which plates, papers or films are immersed, and also to the vessel holding such solutions.

Bausch & Lomb Lenses—VI.

Bed, Swing—I, 84, 85.

Many of the modern folding cameras have the front portion which forms the bed so adjusted that it is possible to change its position from the horizontal, thus permitting of the lens being pointed upward or downward. The *swing-bed* takes the place of the swing-back and when a camera is equipped with a swing-bed, usually there is only one swing to the *back,* which is the *side-swing.*

Beginner's Difficulties—I, 132–165.

Behind-the-lens Shutter.

(*See* **Shutter, Behind-the-Lens.**)

Bellows.

An expanding and collapsible leather body provided in most modern cameras to connect the front and back portions, thus making the camera more convenient and portable.

Benzene—C_6H_6.

Benzol; Coal Naphtha.

Clear, colorless, mobile, highly refractive liquid. *Soluble* in

alcohol, ether, acetone, chloroform, glacial acetic acid and oils. *Used* in making varnishes, retouching mediums, etc.

Benzin.
(*See* **Naphtha.**)

Benzol.
(*See* **Benzene.**)

Between-the-lens Shutter.
(*See* **Shutter, Between-the-Lens.**)

Bicarbonate of Soda.
(*See* **Sodium Bicarbonate.**)

Bichloride of Mercury.
(*See* **Mercuric Chloride.**)

Bichromated Gelatin.
A term applied to the carbon process. Gelatin sensitized with potassium bichromate.

Bichromate of Potash.
(*See* **Potassium Bichromate.**)

Bichromate of Potash Ray Filter—III, 185-192, Page 101.
(*See* **Color Filter.**)

Biconcave.
(*See* **Lens, Biconcave.**)

Biconvex.
(*See* **Lens, Biconvex.**)

Binder—V, 949–966, Page 331.
A gummy strip of paper used for binding lantern-slide and cover-glass together.

Birds, Photographing—III.

Bisection of a Line, Artistic—III, 226-234, Page 114.

Bisulphide of Carbon.
(*See* **Carbon, Disulphide.**)

Bitumen.
(*See* **Asphaltum.**)

Blackboard Paint.
(*See* **Varnish, Blackboard.**)

Black for Aluminum.
(*See* **Varnish, Aluminum.**)

Black for Cameras.
(*See* **Varnish, Black.**)

Black for Wood or Leather.

(*See* **Varnish, Black.**)

Blacking—VI.

To avoid reflecting light the interiors of cameras, plate-holders, lens tubes, etc., must be coated with a dead-black color. (*See* **Varnish.**)

Blanchard's Brush.

Made by fastening a piece of Canton flannel, by means of an elastic band, to a strip of glass or wood, 2 inches wide and 6 inches long. Used for giving plates a substratum coating, and for coating plates or paper with albumen, etc.

Bleaching Solution for Gaslight Prints—IV, 848; **V,** 702–712.

Blending—VIII.

Blind Shutter, Roller.

(*See* **Shutter, Roller Blind.**)

Blistering—I, Page 84; **II,** 77; **IV; V,** 689, 711, 780.

The formation of blisters on gelatin coated plates or paper. Caused by the unequal expansion of the film, which may be due to passing from one bath to another of different temperature or specific gravity; also, may be due to unsatisfactory coating, etc. The best known remedy is to use all solutions at a certain temperature, and the addition of a little salt to the first wash water in the case of P. O. P. If blistering is very bad the prints should be plunged, immediately after fixing, into a saturated solution of common salt.

Blisters on Bromide Paper—V, 689, 748, 780.

Avoided by adding one-half of the following solution to every 4 ozs. of fixing bath:

Sulphate of Aluminum	3 ozs.
Water	24 ozs.

Shake this solution well, then allow to clear. Blistering on bromide papers may be cured by laying prints for a few minutes in a solution of

Chrome Alum	20 grs.
Water	8 ozs.

and then in another similar solution to which 8 ounces of alcohol has been added. If blistering is not excessive, the prints may be laid in alcohol only.

Blisters on Developing Papers—IV, 758, 759, 933, 949.

Avoided by adding about 5% of alcohol to the developer.

Blisters on Dry Plates—II. 77.

Avoided by immersing the dry plate, immediately upon their first appearance, in a solution of powdered alum or chrome alum, or a weak solution of formalin. (*See* reference.)

Blocking-Out—IV, 1157-1164.

Suppressing, or painting out with opaque paint, any part of the negative which it is not desired to have printed. The blocking-out should be done by painting, preferably on the back of the negative. Ready prepared "opaques" are obtainable from photographic dealers, yet the following will be found very satisfactory:

Asphaltum	½ oz.
Beeswax	85 grs.
Carbon Black	40 grs.
Turpentine	5 ozs.

Blooded Stock, Photographing—III, 597-604.

Blotting Paper.

(*See* **Paper, Blotting.**)

Blue Glass—III, 209.

Useful in viewing a landscape to secure an idea of the effect when reduced to monochrome.

Blue-Print Process—I, 366–374; **IX.**

Ferro-Prussiate, or Heliographic, or Cyanotype Process.

An iron printing process. Development effected by water only.

Blue-Print Process—Sensitizing Solution—I, 367.

Blue Tones on Bromide and Developing Papers—V, 713–715.

Blue Vitriol.

(*See* **Copper Sulphate.**)

Blurring.

When an image has a double or an indefinite outline it is said to be blurred. May be caused by movement of object or by jarring the camera during exposure; also caused by halation, aberration, or poor focusing of image on ground-glass.

Boiling Point of

Water	212 degrees Fahr.
Alcohol	176 degrees Fahr.
Ether	96 degrees Fahr.
Mercury	662 degrees Fahr.

Bookkeeping, Studio—VIII, 712–731.

Borax.

(*See* **Sodium Borate.**)

Border Printing—IV.

Botanical Studies—IX.

Bottles.

Care should be exercised in selecting bottles for various chemicals. *Acids and ammonia* should be kept in glass-stopper bottles and the stoppers rubbed with a little vaseline, which not only renders the bottles air-tight but prevents the stoppers from sticking. *Solids* should be kept in wide mouth bottles. *Chemicals sensitive to light* should be kept in amber or non-actinic bottles.

Bottles, Dropping.

A small bottle which will hold liquids, and from which small quantities of the liquid can be obtained in drops.

Bottles, To Clean.

To remove PHOTOGRAPHIC SOLUTIONS use hydrochloric acid mixed with an equal quantity of water. GREASE; rinse with benzene, then apply a strong solution of sodium carbonate. VARNISH; rinse with alcohol, 1 ounce, and ammonia, 1 dram; then ammonia, ½ ounce, water, 5 ounces, and follow this with a good wash in water.

Bottles, To Dry.

Pour some dry mustard seed into the bottle and shake well. The seeds soon absorb the moisture and leave the interior of the bottle clean and dry.

Bottles, Ink for Labeling Glass.

(*See* **Glass, Writing on.**)

Bottle Stoppers.

Alkalies attack the glass of bottles as well as stoppers and tend to cement them together. For this reason they should be treated with paraffin wax.

Bottle Stoppers, To Loosen.

(*a*) Tip the bottle slightly to one side, yet not sufficiently to have the solution run into the neck. Then quickly heat the neck of the bottle with a lighted match or candle. This causes the neck to expand slightly, which will invariably loosen the glass stopper. The bottle should, of course, be revolved so as to heat all sides of the neck uniformly.

(*b*) Run a little sweet oil around the stopper and allow it to stand for about an hour.

Brass, To Blacken—III, 676.

(*a*)

Copper Nitrate .....100 grs.
Water .....½ oz.

(*b*)

Silver Nitrate .....100 grs.
Water .....½ oz.

After preparing the two solutions separately, mix. Clean the brass thoroughly, and them place in the solution. Remove and heat considerably.

Breadth—III, 253.

A term, in composition, to denote the proper balance and relative value between the lights and darks of a picture. Breadth is secured by making a principal object predominate, keeping parts of secondary importance in due subordination.

Brilliancy.

When a negative is snappy and bright, possessing pleasing contrast between high-lights and shadows, it is said to be brilliant. Brilliancy results from correct exposure and careful development.

Broad Lighting—VI, 167; VII.

Broad Profile Lighting—VI, 336–347; VII.

Broken Negative—X.

Bromide Enlarging—V.

Bromide of Ammonium.

(*See* **Ammonium Bromide.**)

Bromide of Barium.

(*See* **Barium Bromide.**)

Bromide of Cadmium.

(*See* **Cadmium Bromide.**)

Bromide of Calcium.

(*See* **Calcium Bromide.**)

Bromide of Potassium.

(*See* **Potassium Bromide.**)

Bromide of Silver.

(*See* **Silver Bromide.**)

Bromide of Sodium.

(*See* **Sodium Bromide.**)

Bromide Paper—V.

Paper coated with sensitive gelatino-bromide of silver, and employed for enlargements or contact printing. Must be handled in deep yellow or ruby light. There are various grades, surfaces, degrees of sensitiveness, etc. (*See* **Gaslight Paper.**)

Bromine—Br.

Very dark reddish-brown liquid. **Poisonous.** Compounded with silver, potassium, ammonium, etc., is vitally useful in photography. Silver bromide, especially, forms the principal sensitive chemical in the dry plate emulsion. Potassium bromide is very useful as a restrainer in developing solutions.

Bronzing—IV, 579, 580.

In silver printing, as well as in printing collodion and platinum papers, the hardest or darker portions assume an olive-green color after prolonged exposure. This is called bronzing of the shadows. In the silver papers this disappears on toning, but in the platinum process if bronzing is allowed to go to the extreme the bronzing will appear in the finished print. In the latter case, however, the bronze is overcome by special treatment fully explained in Volume IV.

Brush Development—VIII, 629–637.

Bubbles.

(*See* **Air-bells.**)

Buildings, Photographing—I, 105–110; **III.**

Bunsen Burner.

A gas jet so constructed that air and the gas mix in such proportions that they burn with a non-luminous flame. The principal advantages are: Small consumption of gas, the great heat it gives out, and the entire freedom from smoke.

Burette.

A measuring instrument consisting of a slender tube at the bottom of which is a minute spigot. The tube is graduated so as to divide the fluid into hundredths and thousandths.

Burnisher.

A machine for giving a high gloss to photographs by drawing them, under pressure, over a heated nickel-plated roller; also used cold for rolling and flattening prints.

Burnt Sienna.

A coloring matter; often used in backing plates to prevent halation.

Bust Portrait.

A portrait which shows the head and upper portion of the body of the sitter.

C

Cabinet.

A term generally applied to a special size of picture—3⅞ x 5½ inches. Of course, it also has the general meaning of a covered or enclosed *cabinet* in which may be stored various articles, etc.

Cadmium Bromide—$CdBr_2$—II.

Yellowish, crystal powder. *Soluble* in alcohol and ether. *Used* sometimes in the preparation of gelatin plates on account of it being preferable to the other bromides, because of its stability, its solubility in alcohol and ether and its durability.

Cadmium Iodide—CdI_2—II.

Colorless, flaky crystals. *Soluble* in water, alcohol or ether. *Used* as an iodizer for collodion.

Calcium Bromide—$Ca\ Br_2$.

White granules; very deliquescent; sharp, saline taste. *Soluble* in water and alcohol. Keep well stoppered. *Used* in sensitizing solutions.

Calcium Carbide—CaC_2.

Grayish-black, irregular lumps. Decomposes with water, evolving acetylene (C_2H_2) and leaving residue of slacked lime. The acetylene evolved may be taken up by acetone, which will hold 60% of its weight of the gas in solution.

Calcium Carbonate—$CaCO_3$.

Precipitated Chalk.

Fine, white, amorphous powder. *Soluble* in acids. *Used* for neutralizing the gold toning bath.

Calcium Chloride—$CaCl_2$—V.

Muriate of Lime.

Pure white, very deliquescent, granular powder, or white, light, easily broken sticks or white lustrous lumps. It absorbs moisture to an enormous degree and, therefore, is used in boxes and tins containing platinum paper in order to keep the paper absolutely dry. When saturated with moisture it may be restored to its full efficiency by placing in a hot oven, then cooled as quickly as possible in a dry place and placed in an air-tight tin.

Calcium Sulphate—$CaSO_4 + 2H_2O$.

Plaster of Paris; Gypsum.

Fine, white powder. *Soluble,* with difficulty, in water. If mixed with a small quantity of water, so as to form a paste, it will gradually thicken afterwards, solidifying to a hard mass of hydrated sulphate. Should be kept in air-tight glass-stoppered bottles. *Useful* for mending leaks or repairing broken bottles. If stale, heat to 400° Fahr., before using.

Calcium Tube.

A cylindrical tube of metal used for the preserving of platinum or other ready sensitized papers. (*See* **Calcium Chloride.**)

Calotype.

Talbot-type.

The first paper negative process, invented by Henry Fox Talbot, and very largely used at one time.

Cameo.

A photograph, the surface of which is slightly convex. Made in this shape, after mounting, by means of a die and press.

Camera—I; VII; IX.

Essentially a light-tight box with a lens at one end and a means for supporting a sensitive plate or film at the opposite end at right angles to the axis of the lens. Various modifications have been made to this simple form of construction for various purposes.

Camera Bellows.

(*See* **Bellows.**)

Camera, Box—I, 42, Page 46.

The simplest form of construction of the camera. Usually fitted with single lenses and shutters, giving both instantaneous and time exposures.

Camera, Detective.

A camera made to look as little like a camera as possible, or one which is capable of being used to take pictures when hidden from sight.

Camera, Double Extension or Long Focus—I, 44, Page 46.

A camera so constructed that it can be used with a long-focus lens. Its usual construction is in the form of a folding camera with extension bed and extra long bellows.

Camera, Enlarging and Copying—V.

A camera with extension bellows for copying and enlarging negatives or positives on glass or paper.

Camera, Ferrotype.

An instrument usually employed in making ferrotypes. Contains a number of small lenses, each being partitioned off. It is thus possible to make several images upon the plate at one time.

Camera, Film—I, 45.

Film cameras are of two general forms, one being of the box type, the other the folding type of construction. In both roll films are used in place of dry plates.

Camera, Film-Plate.

This is a form of camera in which either cut films or plates may be used. The films are arranged in what is known as a film pack, and this latter is inserted in the film pack adapter, which takes the place of the regular plate-holder.

Camera, Fixed Focus—I, 69, 70.

A camera in which the lens cannot be moved for adjustment. The lens is focused for practically any distance within certain limits. (*See* **Lens, Fixed Focus.**)

Camera, Folding—I, 44–46, Page 46.

One of the most compact forms of construction for cameras. When closed the bed of the instrument forms one side and the bellows being operated on a track is brought together inside of the box, thus reducing the bulk.

Camera, Hand.

A convenient form of camera which can be operated when held in the hand. Usually the front portion holding the lens slides into the box, which latter is then closed by raising the bed.

Camera, Magazine—I, 43.

A box form of camera arranged to hold a dozen plates. A plate is brought into focal position by means of a button or release. After exposure the plate drops forward and falls to the bottom of the camera box, while another plate is brought into position for the next exposure.

Camera, Multiplying.

A multiplying camera is one so constructed that it is possible to make on one 5 x 7 plate, either four, nine, twelve, sixteen, twenty, thirty or forty-two exposures, as well as full cabinets. Generally known as a penny picture camera.

Camera Obscura.

A dark chamber in which a ray of light is admitted by means of a small hole or lens. Figures of objects passing outside are

projected onto a mirror which is placed at an angle of 45 degrees, and which, in turn, reflects the objects onto a white screen. If the mirror were not used the objects would be inverted.

Camera, Panoramic—I, Page 45; **III,** 514.

A camera so constructed as to include a very wide angle of view. Usually effected by swinging the lens during exposure, or by moving of the sensitive film, which is operated on a curved surface.

Camera, Photo-micrographic.

A camera attached to the microscope for photographing microscopic objects. (*See* **Photo-micrography.**)

Camera, Portrait.

A rigidly constructed camera, being especially designed for portrait work in the studio.

Camera, Reflex—III, 460, Page 184; **VI.**

A camera in which a mirror is employed to throw a full-size image on a ground-glass at the top of the camera. thus enabling focusing to be done up to within an instant of making the exposure. The mirror is thrown out of position immediately preceding the exposure by the operation of pressing the button, which also releases the shutter.

Camera, Solar.

An apparatus consisting of an arrangement for enlarging in which the rays of the sun are used to illuminate the negative.

Camera, Stereoscopic.

A double camera fitted with two lenses, the centers of which are about 3¼ inches apart. The focal lengths of the lenses are equal. The size of the image projected by each lens is usually about 3¼ inches square.

Camera, Studio.

(*See* **Camera, Portrait.**)

Camera Stand.

A table or support arranged to hold the camera.

Camphor—$C_9H_{16}CO$.

Gum camphor.

White, translucent masses with numerous cracks; easily broken but difficult to powder. Soluble in alcohol, ether, chloroform, benzene; slightly soluble in water. *Used* in certain varnishes; sometimes added to gelatin, albumen, etc., to prevent decom-

position. A small piece of camphor added to kerosene oil in a lamp increases the whiteness of the flame.

Canada Balsam.

(*See* **Balsam, Canada.**)

Candle Power.

The illuminating power of a sperm candle burning at the rate of 120 grains per hour.

Canvas, Mounting on.—V, 727.

Albumen or glossy prints as well as others are mounted on canvas for convenience in carrying, as they can then be handled quite carelessly without fear of being torn. The canvas should be sprinkled with water and then stretched upon a wooden frame, when the prints can be easily mounted by the use of any good starch paste. Ready prepared mounting canvas with paper on one side can be procured from regular dealers.

Cap.

A loose leather cover for the lens.

Caramel—III, 173.

Burnt Sugar.

A dark brown soluble compound; deliquescent; bitter taste. Sometimes used in formula for backing plates to prevent halation.

Carbolic Acid.

(*See* **Acid Carbolic.**)

Carbon—C.

Carbon for photographic purposes is usually prepared from lampblack. Is very stable. The basis for the carbon process, which is the most permanent process known.

Carbon Disulphide—CS_2.

Bisulphide of Carbon.

Clear, colorless, neutral liquid. Highly refractive and inflammable. Sharp, aromatic taste. Peculiar odor. *Soluble* in alcohol, ether, chloroform, fixed and volatile oils.

Carbon Paper.

Carbon Tissue.

Pigmented gelatin coated on paper. Can be readily sensitized with potassium bichromate.

Carbon Process—V.

A printing process in which bichromated gelatin and carbon, which form a pigment, are coated upon paper. The print

is developed from the back with water of different temperatures; the parts exposed to light have been rendered insoluble, the unexposed portions only are washed away. The single and double transfer processes are fully described in the general instruction given in the library.

Carbonate of Ammonia.

(*See* **Ammonium Carbonate.**)

Carbonate of Potash.

(*See* **Potassium Carbonate.**)

Carbonate of Soda—II; IV, 465-467.

(*See* **Sodium Carbonate.**)

Carbonic Acid—IV, 249.

(*See* **Acid Carbonic.**)

Carboy.

A large glass bottle enclosed in a box or basket. Used principally for holding corrosive acids.

Caricature.

A photograph in which the natural characteristics of a person, or objects, are distorted or exaggerated.

Carrier, Background.

A frame for supporting a background.

Carte-de-Visite.

A small photograph—about 2½ x 4⅛ inches in size.

Cartridge.

A small case of metal, glass or paper in which photographic compounds, in their dry state, can be placed for convenience. The chemicals are put up in this form for toning, fixing, developing, intensifying, reducing solutions, etc.

Cast-Iron, Cement for.

A good cement for stopping holes in castings, etc., is made by mixing the following chemicals with water into a thick paste. Always mix fresh before use.

Sifted Cast-Iron Filings	10 ozs.
Sal Ammoniac (powdered)	2 drms.
Sulphur	1 drm.

Castile Soap.

A fine, highly purified soap. When perfectly fresh, yellowish-white in color. *Used* to wax prints before burnishing by rubbing the surface of the print with a piece of flannel which has previously been rubbed on the soap.

Castor Oil—II.

A thick, oily liquid. *Soluble* in ether and alcohol; insoluble in water. *Used* in the preparation of collodion and varnishes to make them tougher; also in rendering paper, or paper negatives, translucent.

Catalog Illustrating—IX.

Catch-Lights—VI, 246, 262.

Caterpillars, Photographing—III, 632, 633.

Cats, Photographing—III, 578-590.

Cattle, Photographing—III, 567-602.

Caustic Potash.

(*See* **Potassium Hydroxide.**)

Caustic Soda—II, 420.

(*See* **Sodium Hydrate.**)

Celloidin.

Pure gun cotton with some solvent. Prepared by Schering for making collodion. As *celloidin* is of very uniform texture and all impurities have been eliminated, it is preferred to gun cotton for making collodion.

Celluloid—VI, 177.

A transparent, flexible, or horny substance, very inflammable. *Used* as a support for films; as imitation ivory for miniatures; and, when dissolved, as a varnish.

Celluloid, To Mount on.

Schering's Celloidin .....1 drm.
Amyl Acetate .....2 ozs.

Float the print on this solution, also apply the solution to the celluloid, then squeegee the two together.

Celluloid Varnish.

(*See* **Varnish.**)

Cellulose—$C_6H_{10}O_5$.

Pure cellulose is manufactured by boiling linen and cotton fibre with diluted potassium caustic. The cellulose is extracted with alcohol and ether. A mixture of nitric and sulphuric acids converts it into gun cotton, which latter is used in making collodion.

Celor Lens.

(*See* **Lens Celor.**)

Cement for Glass.
(*See* **Glass Cement.**)

Cement for Iron.
(*See* **Cast-Iron.**)

Cement for Leather.
(*See* **Leather Cement.**)

Cement for Porcelain.
(*See* **Porcelain Cement.**)

Centigrade Thermometer.
(*See* **Thermometer, Centigrade.**)

Centigramme.
The one-hundredth part of a gramme—a measure of weight used in the Metric system.

Centilitre, or Centiliter.
The one-hundredth part of a litre—a Metric measure of capacity or volume.

Centimetre, or Centimeter.
The one-hundredth part of a meter—a Metric measure of length.

Chalk.
(*See* **Calcium Carbonate.**)

Chalk, French.
Steatite or Soapstone.
Powdered *French chalk* is used for lubricating woodwork. Also to prevent gelatin or similar substances adhering to glass.

Chalkiness.
Excessive contrast in negatives or prints—the high-lights of the print being pure white.

Changing Bag.
A light-tight cloth bag used for changing plates, loading plate-holders, etc.

Changing Box.
(*a*) A box for holding exposed plates. (*b*) A box which may be attached to the camera for unloading and refilling plate-holders.

Character Charts—X.

Character, Preserving—X.

Cheek, Retouching—X.

Chemical Action of Light.
(*See* **Light, Chemical Action of.**)

Chemical Focus.
(*See* **Focus, Chemical.**)

Chemical Fog.
(*See* **Fog, Chemical.**)

Chemicals—I, 266–277; **II.**

Chemical Symbols—II.

Chemistry.
Chemistry is the study of chemicals, their origin, combinations, properties, etc., and takes into consideration solids, liquids and gases. (Also, *see* **Qualitative and Quantitative Analysis.**)

Chemistry, Inorganic.
The chemistry which treats of metal bodies.

Chemistry, Organic.
Generally speaking, the chemistry which treats of bodies which are not metals.

Chickens, Photographing—III, 592–596.

Child Portraiture—VI; VII; X.

Chiaroscuro.
An art term denoting correct arrangement and proportion of light and shade in a picture.

Chin, Retouching—X.

Chlorate of Potassium.
(*See* **Potassium Chlorate.**)

Chloride of Aluminum.
(*See* **Aluminum Chloride.**)

Chloride of Ammonium.
(*See* **Ammonium Chloride.**)

Chloride of Calcium.
(*See* **Calcium Chloride.**)

Chloride of Gold.
(*See* **Gold Chloride.**)

Chloride of Lime.
(*See* **Lime Chloride.**)

Chloride of Magnesium.
(*See* **Magnesium Chloride.**)

Chloride of Mercury.
(*See* **Mercurous Chloride.**)

Chloride of Platinum.
(*See* **Platinum Chloride.**)

Chloride of Potassium.
(*See* **Potassium Chloride.**)

Chloride of Silver.
(*See* **Silver Chloride.**)

Chloride of Sodium.
(*See* **Sodium Chloride.**)

Chloride of Zinc.
(*See* **Zinc Chloride.**)

Chloride Paper.
Paper coated with a gelatino-chloride emulsion.

Chloride Plates.
Plates with a chloride of silver gelatin emulsion and are used for lantern-slides and transparencies.

Chlorine Water.
Clear, pale, greenish-yellow liquid. *Used* as a hypo eliminator.

Chloroform—$CHCl_3$.
Clear, colorless, highly refractive, heavy liquid with characteristic odor; sweet taste. *Used* as a solvent of India rubber, amber and other gums.

Chloroplatinite of Potassium.
(*See* **Potassium Chloro-Platinite.**)

Chromatic Aberration.
(*See* **Aberration Chromatic.**)

Chrome Alum.
(*See* **Alum Chrome.**)

Chrome Yellow.
(*See* **Lead Chromate.**)

Churches, Photographing—III, 103, 104, 108.

Cinematograph.
An apparatus for projecting a series of slightly different photographs of a subject, taken on a continuous length of film, in very rapid succession.

Circle.
To find the *area* of a circle, square the diameter and multiply

by .7854. To find the *circumference* of a circle multiply the diameter by 3.1416. To find *diameter, see* Diameter.

Citric Acid.
(*See* **Acid Citric.**)

Clean Bottles, To.
(*See* **Bottles, To Clean.**)

Clearing Solution.
(*See* **Solution, Clearing.**)

Cloth, Mounting on—V, 727.

Cloud Negatives—III, 393–419; **IV,** 1147–1156; **V,** 932–948.
Special negatives of clouds to be used for printing-in with landscape negatives.

Cloud Shutter.
(*See* **Shutter, Cloud.**)

Cloud, Snow and Frost Photography—III.

Coagulate.
To clot or curd, changing to a semi-solid state without evaporation or crystalization.

Coating.
A synonymous term used for the emulsion employed on plates or paper.

Cockling.
To shrink, pucker or wrinkle. Prints may be prevented from cockling by adding a little glycerin to the last water when washing.

Coffee, Dyeing Cheese-Cloth in—VI, 194.

Coffee Toning—IV, 439.

Coins as Weights.

Silver dollar and a nickle	1 oz.
Half dollar and a dime	½ oz.
Half dollar	200 grs.
Nickle and a dime	¼ oz.
Nickle	1-6 oz.
Cent	50 grs.
Dime	1·12 oz.

Collinear Lens.
(*See* **Lens, Collinear.**)

Collodio-Albumen Process.

The first dry-plate process in practical use. Had the disadvantage, however, of being slow.

Collodio-Carbon Paper—IV, 325-439.

Collodio-Chloride Paper.

(*See* **Paper Collodio-Chloride.**)

Collodion—II.

Simple solution of nitrate and cellulose. Colorless, or slightly yellowish, neutral, syrupy liquid; when exposed in thin layers, evaporates and leaves colorless film. *Used* before the introduction of gelatin as a vehicle to hold the sensitive salts in emulsion. Its advantage over gelatin is that it allows of the making of an extremely dense negative, the film being very thin and practically devoid of grain. Although not in as general use as gelatin, it is employed for the making of both wet and dry plates when it is desired to secure specially clear, brilliant negatives. Is used almost exclusively in process work. (*See* **Pyroxylin.**)

Collodion Paper— IV, 73-111.

Collotype.

A photo-mechanical printing process based upon the fact that bichromated gelatin, when exposed to the action of light, becomes insoluble. The bichromated gelatin is spread upon glass, metal, paper or other support and printed in daylight under a negative; the parts unaffected by light being etched away by soaking in a solution generally consisting of water, glycerine and sugar. The plate is then covered with a greasy ink, which latter adheres to the portions which have been etched away, and is repelled by the parts which were affected by the light, and which latter have absorbed water. Collotypes are printed on regular printing presses.

Color Corrected Materials—III.

Color Filters—I; II; III.

A colored screen used in the process of orthochromatic photography as well as color photography, etc. RELATIVE AMOUNT OF DYE—If a color filter in the form of a cell containing a dye or color in solution is being used, and it is desired to change and make a filter by coating a gelatined sheet of glass, the quantity of solid dye to use for the latter will be the same as required for the cell, if the surface area is the same; *i. e.* if the face of the cell is $4 \times 4 = 16$ square

inches, and the quantity of dye used in the tank is 5 grains, then 5 grains of dye must be spread over 16 square inches of glass.

Color Filters, Ascertaining Exposure for.

The easiest plan is to focus the camera on a white card. Expose sections of an orthochromatic plate, without the filter, doubling the exposure each time. To do this the slide in the plate-holder should be withdrawn about ½ inch for the first exposure, one inch for the second, etc. Then, expose another plate in the same way, using the color filter. Develop the two plates together, in the same tray, place in the fixing bath at the same time, and then compare the strips. It will be easily seen which strips coincide—the increase in exposure is then known.

Color Photography—I; V; VI.

A process reproducing natural colors. There are various processes in the course of experimentation, some of which have reached a practical basis; others, although producing excellent results, are limited more to the experimentalist and amateur than to the commercial worker.

Color Screen.

(*See* **Color Filter.**)

Color Sensitive Plates.

(*See* **Orthochromatic; also Plates, Orthochromatic.**)

Coloring Lantern-Slides—V, 1007–1028.

Colors, Prismatic.

(*See* **Prismatic Colors.**)

Coma.

A defect in a lens caused by incomplete correction of the spherical aberration of oblique rays. It is a pear-shaped or comma-shaped blurr of light partly surrounding the image and a bright light.

Combination Printing—III, 395-398; **IV,** 1147-1167.

An operation requiring two or more negatives, from which the whole or portions are printed for securing the best of composition and the most pleasing effect in a picture.

Combined Toning Bath.

(*See* **Toning Bath, Combined.**)

Combustion.

Chemical action producing the sensation of heat and sometimes light.

Commercial Acetic Acid.
(*See* **Acid, Acetic.**)

Commercial Photography—IX.

Commercial Photography, Developer for—II; IX.

Commercial Photography, Lens for—VI.

Commercial Photography, Plates for—II.

Comparative Exposure.
(*See* **Exposure, Comparative.**)

Composite Photograph.
(*See* **Photograph, Composite.**)

Composition—III; VII.

An art term which designates the difference between a good and a bad picture and constitutes the general arrangement of lines, lights, shades and masses.

Concave Lens.
(*See* **Lens, Concave.**)

Concave, Double.
(*See* **Lens, Concave, Double.**)

Concave, Plano.
(*See* **Lens, Concave, Plano.**)

Concavo-Convex Lens.
(*See* **Lens, Concavo-Convex.**)

Concentrated Solutions.
(*See* **Solutions, Concentrated.**)

Condenser—V; VI.

A lens used to collect the rays of light, concentrating them upon one point. Used in enlarging, and lantern-slide, lanterns.

Cone.

(*a*) An optical term used to denote a pencil of rays of light which emanate from a point and diverge as they proceed on their course. (*b*) An attachment made of paper or tin (blackened) placed on the front of the lens to prevent the objectionable rays of light from entering the lens.

Conjugate Foci.
(*See* **Foci, Conjugate.**)

Construction Work—IX.

Contact, Optical.
(*See* **Optical Contact.**)

Contact Printing.
(*See* **Printing, Contact.**)

Continued Action of Light.
(*See* **Light, Continued Action of.**)

Contrast—IV, 838, 839, 943.
The degree of difference between high-lights and shadows. (*See* **Chalkiness.**)

Convergent.
An optical term applied to rays of light which, if continued, will meet in a focus.

Convergent Lens.
(*See* **Lens, Convergent.**)

Convertible Lens.
(*See* **Lens, Convertible.**)

Convex Lens.
(*See* **Lens, Convex.**)

Convexo-Concave.
(*See* **Lens, Convexo-Concave.**)

Convexo-Convex.
(*See* **Lens, Convex, Double.**)

Convexo-Plane.
(*See* **Lens, Convexo-Plano.**)

Cooke Lens.
(*See* **Lens, Cooke.**)

Copal.
Gum Copal; Resin Copal.
Yellowish to yellowish-brown pieces of various sizes. Glossy, odorless and tasteless. *Soluble* in alcohol, ether, turpentine and linseed oil, after having been fused. *Used* as a substitute for amber, also in varnishes and cements.

Copper—Cu.
Granulated, sheet and filings. Reddish in color, ductile, malleable, hard metal. *Used* to precipitate the silver from old fixing baths.

Copper Sulphate—$CuSO_4 + 5H_2O$**—II.**
Copperas; Blue Stone; Cupric Sulphate; Blue Vitriol.
Large, deep-blue crystals, slowly efflorescent in dry air; stringent, metallic, styptic taste. *Soluble* in 2.6 parts water. *Used* to bleach untoned prints or bromides when desired to

sketch over with India ink for *line* reproduction; also, used in conjunction with other chemicals for toning bromide prints.

Copying—V, 460–561.

Term applied to making copies.

Copyright—VIII.

Corrosive Sublimate.

(*See* **Mercuric Chloride.**)

Cotton, Gun.

(*See* **Pyroxyline.**)

Cotton Wool.

Raw Cotton.

Cover-Glass—V.

A plain glass used to protect the film side of a lantern-slide.

Covering Power.

(*See* **Lens, Covering Power.**)

Cracked Negatives—X.

Cramer Plates—II, 551-641.

Crookes' Tube.

A large vacuum tube, spherical or pear-shaped, used in conjunction with a powerful induction coil to produce Rontgen, or X-rays.

Crown Glass.

(*See* **Glass, Crown.**)

Crucible.

An earthenware vessel made to withstand very high temperatures. Used for melting or fusing various metals and chemicals.

Crystals.

An inorganic substance which has assumed the form of a regular solid, commonly bounded by plane surfaces. Crystals of various substances may be formed by dissolving or by fusing, and allowing to cool gradually.

Crystalization.

The process of becoming crystalized.

Crystal Markings.

The formation of crystals on the surface of the negative due to improperly washing after fixing.

Cupric Sulphate.

(*See* **Copper Sulphate.**)

Curvature of Field—VI.

An optical term used to denote the effect produced by a lens, the field of which is spherical in shape rather than plane. In other words, the focus of the central rays of light on a plane farther from the lens than that of the marginal rays.

Cut-out Forms—IV, 1214.

Sheets of brass, celluloid or other material, having openings of various sizes and shapes for the trimming of prints by means of a small cutting wheel.

Cutting Plates.

(*See* **Plates, Cutting.**)

Cyanide of Potassium.

(*See* **Potassium Cyanide.**)

Cyko Paper—IV, 898-956.

D

Dagor Lens.

(*See* **Lens, Dagor.**)

Daguerreotype—I, Page 33.

One of the first photographic processes. The picture is obtained on a highly polished silver plate. With this process a direct positive is obtained, the plate being sensitized by exposure to fumes of iodine in a dark box. After exposure in the camera, the latent image is developed by fumes of mercury and fixed by hypo and sulphite of soda. The process is named after the inventor, Daguerre, and was first successful in 1839.

Dallmeyer Lens.

(*See* **Lens, Dallmeyer.**)

Damar.

Dammar.

Yellowish-white, roundish, semi-transparent masses of varying degrees of hardness. *Soluble* in oil of turpentine, benzole or chloroform. *Used* in varnishes and retouching mediums.

Dark-Room—I; II; VII; IX.

Developing-Room.

A room from which all actinic light has been excluded and in which the sensitive plates and papers are handled during

the process of changing, developing and printing. For ordinary plates and papers the ruby light is sufficient, but for color sensitive materials, almost total darkness is required. A green light, however, is employed for plates which are sensitive to red, etc.

Dark-Room Lamps—II.

(*See* **Lamp.**)

Dark Slide.

An English term for the plate-holder.

Dead Black.

(*See* **Varnish.**)

Decantation.

The separation of a clear liquid from a precipitate deposit. Accomplished by gently inclining the graduate or allowing the liquid to run out without disturbing the precipitate at the bottom; also effected by means of a siphon.

Decilitre or Deciliter.

A Metric measure of volume.

Decimetre or Decimeter.

A Metric measure of length.

Décolleté, Subjects in—X.

Decomposition of Light.

(*See* **Light, Decomposition of.**)

Definition—VI.

An optical term meaning the defining power of a lens—clearness and sharpness of image produced.

Deflagration.

Rapid combustion.

Deflection.

An optical term meaning the bending of a ray of light toward the surface of an opaque body.

Dekagramme.

A Metric measure of weight.

Deliquescent.

A solid is said to deliquesce when it possesses the property of becoming soft or liquid by absorbing moisture from the air. *Ex.* Calcium Chloride.

Density.

Printing opacity of a negative.

Depth of Focus.
(*See* **Focus, Depth of.**)

Depth of Printing.
(*See* **Printing, Depth of.**)

Dessicated.
A chemical term meaning that the substance is free from water—dry.

Desk, Retouching—X.

Destructive Distillation.
(*See* **Distillation, Destructive.**)

Detail.
Sharply, clearly defined reproduction of an object. The use of small stops gives more *detail* to the image—necessitates increased exposure.

Developer—I; II; IV; V; VI; VIII.
A solution used to bring out and render visible the latent image in sensitive plates or papers.

Developing—I; II; IV; V; VI; VIII.
The process of rendering an invisible latent image visible. Applied to any process and renders visible a photographic image.

Developing Animal Photographic Negatives—III, 613, 614.

Developing At-home Portrait Negatives—VI.

Developing Architectural Views—III.

Developing Backed Plates—III, 566, 567.

Developing Copies—V.

Developing Cramer Plates—II.

Developing Difficulties—II, 62-94.

Developing Enlargements—V, 661–667.

Developing, Factorial—II, 448-483.
(*See* **Factorial Development.**)

Developing Flashlight Photographic Negatives—VI.

Developing Floral Studies—III, 563-567.

Developing Fuzzy Photographic Studies—III.

Developing Hammer Plates—II.

Developing Interior Photographic Negatives—VI, 72–77.

Developing Instantaneous Exposures—II, 439.

Developing Lantern-Slides—V, 907–917.

Developing Landscape Views—III, 262.

Developing Light—II.

Developing Night Photographic Negatives—III, 526.

Developing, Over-—I; II.

The carrying of development beyond the normal stage, producing too dense an image or silver deposit. An over-developed negative should be reduced. (*See* **Reducer.**)

Developing Over-Exposures—II.

Developing Papers—IV.

(*See* **Gaslight Papers.**)

Developing Pin-Hole Photographic Negatives—III, 687.

Developing Platinum Papers—IV, 543-556.

Developing Seed Plates—II.

Developing Sink—II, 15; VIII.

Developing Snow Photographic Negatives—III, 438, 439.

Developing, Special Pyro—II, 380-412.

Developing, Tank or Stand—II, 484-548.

Developing Under-Exposures—II, 95-128.

Developing, Universal—II, 322-356.

Deviation.

An optical term denoting the change of the course of a ray of light when it is reflected or refracted from its direct course.

Dextrine—IV, 1123-1125.

Whitish powder or transparent yellowish lumps. *Soluble* in water. *Used* as a substitute for gum arabic, also for making mountants.

Diameter.

A line drawn through the center of a circle terminating each way at the circumference. If the circumference of a circle is given and it is desired to find the diameter of it, divide the former by 3.1416, or multiply by .31831.

Diamidophenol.

(*See* Amidol.)

Diamond.

A small piece of diamond mounted in a handle used for cutting glass.

Dianol.

Lumière's preparation of diamidophenol, or amidol.

Diaphragm—I; VI.

Originally a plate having a center of a certain diameter. A series being arranged with openings of relative proportion to the focal-length of the lens to which they belong.

Diaphragm, Iris—I, 58.

An adjustable stop with overlapping leaves which open and close from the center. Manipulated by revolving a ring or lever outside the lens, which gives any desired opening or aperture.

Diaphragm Shutter.

(*See* **Shutter, Diaphragm.**)

Diaphragm, Star.

A metallic star suspended so as to partially obstruct the rays of light from striking the center of the lens. The object is to secure equality of illumination when using extremely wide-angle lenses.

Diaphragm, Waterhouse—I, 58; VI.

A stop cut from a thin sheet of metal and inserted in a slot in the lens mount—commonly known as Waterhouse stops.

Diapositive.

A positive made from a negative.

Dichroic Fog.

(*See* **Fog, Dichroic.**)

Difficulties.

All DIFFICULTIES, *their cause, prevention and remedy, are given immediately following each lesson, or subject, and will be found indexed under such subject headings in the various volumes.*

Diffusion of Focus.

(*See* **Focus, Diffusion of.**)

Diffusion of Gases.

The passing of one gas into the space occupied by another.

Diffusing Screen.

(*See* **Screen, Diffusing.**)

Diffusion of Light—VI.

(*See* **Light, Diffusion of.**)

Diffusion of Liquids.

(*See* **Liquids, Diffusion of.**)

Dilute.

To make thin with water.

Diogen.

A newly introduced developing agent rendering negatives of black color and fine gradation.

Diphenyl—$C_{12}H_{10}$.

White scales. *Soluble* in hot alcohol and ether; practically insoluble in water, but soluble when alkalies or sulphite of soda has been added to the water. A convenient form of developer.

Direct-Vision View-Finder.

(*See* **Finder, Direct-Vision.**)

Dispersion—VI.

Breaking up of white light into its component colors. (*See* **Prismatic Colors.**)

Distance.

The part of the view which appears farthest from the eye. (*See* **Perspective, Aërial.**)

Distance, Line of.

A straight line drawn from the eye to the principal point in the plane of the picture.

Distance, Middle.

A point in a picture midway between the nearest and most remote objects.

Distance, Point of.

The point of the picture where the visual rays meet.

Distillation.

A process whereby a liquid, or even a solid, is heated in order that certain constituents of it may be given off in vapor, and then by a suitable apparatus condensed as a liquid.

Distillation, Destructive.

The heating of non-explosive or non-volatile organic bodies in a retort.

Distilled Water.

(*See* **Water, Distilled.**)

Distortion—V, 680–682; VI; IX.

A defect which will occur when photographing objects having perpendicular lines, if the camera is tilted upward and the ground-glass is not kept parallel to the subject; also an op-

tical defect consisting of the curving of straight lines, which occurs with a single lens.

Divergent—VI.

An optical term denoting the departing or receding of lines from each other.

Dividing the Focus—III, 54.

(*See* **Focus, Dividing the.**)

Doctoring Negatives.

(*See* **Negatives, Doctoring.**)

Dodging in Printing—IV.

As comparatively few negatives are perfect, it is often necessary to hold back certain portions while printing. For example; a hard, contrasty negative with almost opaque highlights and clear shadows can be greatly improved by holding back the printing of the shadows. This is called dodging.

Dope, Retouching—X.

Double Concave.

(*See* **Lens Concave, Double.**)

Double Convex.

(*See* **Lens Convex, Double.**)

Double Exposure.

(*See* **Exposure, Double.**)

Double Extension.

(*See* **Extension, Double.**)

Double Image.

(*See* **Image, Double.**)

Double Mounting.

(*See* **Mounting, Double.**)

Double Plate-Holder.

A plate-holder which will hold two plates.
(*See* **Plate-Holders.**)

Double Printing.

(*See* **Combination Printing.**)

Double Swing.

(*See* **Swing, Double.**)

Double Transfer Paper.

(*See* **Temporary Support.**)

Doublet Lens.

(*See* **Lens, Doublet.**)

Drachm or Dram.
A small weight, being ⅛ of an ounce in apothecaries' weight, or 1/16 of an ounce in avoirdupois weight; also ⅛ of an ounce fluid measure.

Dragon's Blood.
A resin so named because of its red color. Very opaque and brittle, tasteless and without odor. Dissolves in alcohol or ether. Used in the preparation of varnishes.

Drain Rack.
Rack made of wood on which to drain dry plates; also racks placed in sinks on which to rest trays, etc.

Drapery Arrangement, Etc.—VI; VII.

Drapery Portrait Negatives, Developing—II.

Drapery Portrait Negatives, Retouching—X.

Drawing Paper.
A special, tough paper, obtainable at stationery stores. Often used as a base for the Kallitype and other home-sensitizing processes.

Dropping Bottle.
(*See* **Bottle, Dropping.**)

Drop Shutter.
(*See* **Shutters, Drop.**)

Dry Distillation.
(*See* **Distillation, Destructive.**)

Dry Mounting.
(*See* **Mounting, Dry.**)

Dry Mounting Tissue.
(*See* **Mounting Tissue, Dry.**)

Dry Plates—I, Page 37; **II,** Page 9.
Plates of glass coated with an emulsion composed of gelatin and sensitive silver salts.

Drying Negatives.
(*See* **Negatives, Drying.**)

Drying Prints—I, 466.

Duplicator—I, 615–617.

Dynar Lens.
(*See* **Lens, Dynar.**)

E

Eau de Javelle.

A reducing solution composed of chloride of lime and potassium carbonate. *Used* for eliminating sodium hyposulphite from negatives or prints after fixing. It is also a stain remover and a reducer. It may be prepared as follows:

Potassium Carbonate	2 ozs.
Chloride of Lime (dry)	1 oz.
Water	20 ozs.

Mix the chloride of lime with 15 ounces of water and dissolve the potassium carbonate with the remainder. Then mix the two solutions. Boil and afterwards filter. When cool it is ready for use.

Ebonite.

Vulcanite, Vulcanized Rubber.

A hard, black, ebony-like substance, formed by combining sulphur and India rubber. Used for developing dishes, dippers, in the collodion process, slides for plate-holders, etc.

Edinol—II, 460; **IX.**

A good developer for securing soft portrait negatives and owing to the fact that it produces softness, it is especially available for short exposures. A good *snap-shot* formula is:

Edinol	1 drm.
Acetone-Sulphite	187 grs.
Potassium Carbonate	1⅓ ozs.
Potassium Bromide	27 grs.
Water	14 ozs.

Efflorescence.

A chemical term applied to the formation of loose, fine crystals on the surface of a porous substance. Caused by gradual decomposition when exposed to air.

Eikonogen—$NH_2C_{10}H_5(OH)SO_3Na + 2\frac{1}{2}H_2O$**—II.**

White powder; strong reducing power on silver salts. A developing agent giving soft, delicate negatives of good color. Does not stain. May be used in conjunction with pyro and other developers. As it is only slightly soluble in water it is necessary that it be mixed up in bulk, *i. e.,* not in con-

centrated solutions. Different temperatures alter the strength of eikonogen. A good formula for soft results is:

Eikonogen	150 grs.
Sodium Sulphite	300 grs.
Sodium Carbonate	300 grs.
Water	13½ ozs.
Potassium Bromide (10% Sol.)	2 or 3 drops.

Electric Light for Enlarging—V.

Electric Light for Portraiture—VII.

Electric Light for Printing—IV.

Element—II.

An element is a substance which consists of one kind of matter only, *i. e.,* a substance which resists all efforts to divide it into any simpler form. *Ex.* Gold, silver, sodium, etc.

Eliminator, Hypo.

(*See* **Hypo Eliminator.**)

Emery.

A dark-colored, hard mineral. In fine powder it is used for grinding and polishing glass, metal, etc.

Emission, Node of.

(*See* **Nodal Point.**)

Emulsion—II; V.

The coating on plates and paper which is sensitive to light. It is a mixture composed of some viscous substance, such as gelatin or collodion, sensitive silver salts, etc.

Enameling.

The process of giving a high gloss to prints; usually termed squeegeeing, which is accomplished by placing the print on a highly polished glass or ferrotype plate.

Engineering Construction—IX.

Enlarging—II, 21; V.

The process of reproducing large pictures from small negatives or prints. Either artificial light or daylight may be employed.

Enlarging Easel—V.

Enlarging, Lenses for—VI.

Enlarging Room—V.

Epsom Salts.

(*See* **Magnesium Sulphate.**)

Equivalent Focus—III.

(*See* **Focus, Equivalent.**)

Etching—X.

(*a*) The process of reducing the density of the photographic film, usually the high-lights on hard negatives; also outlining figures, altering draperies, placing hand work on landscape and architectural negatives, etc. (*b*) A photo-mechanical process. Eating away certain portions of zinc or copper plates with a dilute solution of nitric, or other, acid.

Etching Knife—X.

Ether—$C_4H_{10}O$.

Ethyl Oxide, or Sulphuric Ether.

Light, transparent, colorless, inflammable liquid; sweet taste. Keep cool in well stoppered bottle away from the fire. *Used* with alcohol and gun cotton in making collodion; also as a solvent for pyroxyline (gun cotton), oils, most resins, gums, balsams and India rubber.

Euryscope Lens.

See **Lens, Euryscope.**)

Evaporate.

To change into vapor. Liquids evaporated at temperatures below their boiling point.

Exposure—I; II; III; IV; V; VI; VII.

The amount of time that light is allowed to act upon the sensitive plate or paper. In EXPOSING A PLATE, the amount of exposure is dependent upon: (*a*) the quality of the light; (*b*) the aperture of the lens; (*c*) the nature and distance of the object; (*d*) the sensitiveness of the plate. In PRINTING the length of exposure is influenced by: (*a*) sensitiveness of the paper; (*b*) opacity of the negative; (*c*) quality of the light; (*d*) distance from the light; (*e*) and, in enlarging, the degree of the enlargement as well as the aperture of the lens. The strength of the developer also influences the required amount of exposure.

Exposure, Comparative—VI.

The various systems of stops or diaphragms are usually marked with their fractional value, which is found by dividing the focal length of the lens by the diameter of their openings. Under precisely the same conditions the required exposures

are proportionately the squares of the denominators of these fractions.

Exposure, Double.

Making two exposures on one plate or sheet of paper.

Exposure for At-home Portraiture—VI.

Exposure for Copies—V.

Exposure for Exterior Work—III.

Exposure for Lantern-Slides—V.

Exposure for Papers—IV.

Exposure for Portraits (Studio)—**VII.**

Exposure, Latitude of.

A term applied to the extent to which it is possible to deviate either way from the exact exposure required for plates or papers without harmfully affecting the character of the resulting image.

Exposure Meter.

(*See* **Actinometer.**)

Exposure, Over- —I; II.

The result of allowing the light to act for too long a period of time upon the sensitive photographic materials, such as plates and papers. Slight over-exposure can be corrected in development by proper manipulation. *Ex.* If pyro is the developing agent, the slight addition of a 10% solution of potassium bromide together with rapidly rocking the tray which contains only enough developer to barely cover the plate, will cause rapid oxidization, therefore, rapid reduction of the salts which have been affected to the greatest degree by the light. The bromide of potassium retards the action of the developer on the parts least affected by the light. This manipulation tends to produce contrast. As a general rule, over-exposed plates should be over-developed and then reduced with potassium ferricyanide. (*See* **Reducer, Farmer's.**)

Exposure, Under- —I; II.

Sensitive materials, such as plates or papers are under-exposed, if they do not receive a sufficient amount of light action. (*See* **Exposure.**)

Extension.

The distance to which the bellows of the camera may be drawn out or extended.

Extension, Double.

A camera so arranged that a bed may be lowered or at-

tached to both front and rear of the body of the camera, or a camera whose bed can be extended almost double its normal length. This gives approximately double the usual length of bellows and allows of extra long focus lenses being used.

Extra Rapid Rectilinear Lens.
(*See* **Lens, Rapid Rectilinear.**)

Extra Rapid Symmetrical Lens.
(*See* **Lens, Rapid Symmetrical.**)

Eyes, Retouching—X.

F

f—VI.
A stop value. (*See* **Diaphragm.**)

Fabric, Printing on—I, 366–374.

Fabric, Ruby.
A translucent cloth given a red color by dyeing. Used for dark-room windows.

Factorial Development—II.
A process of developing the photographic plate by noting the time of first appearance of the image and dividing this amount into the total time required to complete the development. This gives the developing factor for the developing formula. This factor may be employed at all times when using this particular formula, at the same temperature.

Fading—IV, 15.
A defect to which negatives and prints are subject. Usually caused by insufficient fixing as well as insufficient washing after fixing.

Fahrenheit Thermometer.
(*See* **Thermometer, Fahrenheit.**)

Falling Front.
(*See* **Front, Rising and Falling.**)

False Perspective.
(*See* **Perspective, False.**)

Ferric Ammonium Citrate—$Fe_2(NH_4)_2(C_6H_5O_7)_3$ or $Fe(NH_4)_3(C_6H_5O_7)_2$.
Ammonium-Citrate of Iron.
Brownish-red glistening scales, or green scales—the latter is

preferable for photographic purposes. *Soluble* in water; insoluble in alcohol. *Used* in the preparation of blue print paper.

Ferric Chloride—$FeCl_3 + 6H_2O$.

Iron Perchloride.

Deliquescent, orange-yellow crystals. *Soluble* in water and alcohol. *Used* as a negative reducer.

Ferric Nitrate—$Fe(NO_3)_3 + 18H_2O$.

Iron Nitrate.

Grayish-white crystals. *Soluble* in water. *Used* as a sensitizer in the various iron processes.

Ferric Oxalate—$Fe_2(C_2O_4)_3$.

Iron Oxalate, Ferric.

Greenish-yellow scales or powder. *Soluble* in water.

Ferro-Prussiate Process.

(*See* **Blue-Print Process.**)

Ferrotype.

A process in which collodion positives are made upon ferrotype plates instead of glass.

Ferrotype Plates—I; II; IV, 99–104.

A thin sheet of iron coated with black enamel. *Used* instead of glass to enamel gelatin prints. Also used for making tintypes.

Ferrous Oxalate—$FeC_2O_4 + 2H_2O$.

Iron Oxalate, Ferrous.

Pale-yellow, odorless, crystal. *Soluble* in cold hydrochloric and hot diluted sulphuric acids; practically *insoluble* in water. *Used* in conjunction with potassium chloro-platinite for coating platinum paper.

Ferrous Sulphate—$FeSO_4 + 7H_2O$—**II; V.**

Large, bluish-green efflorescent crystals; odorless; saline astringent taste. *Soluble* in water; insoluble in alcohol. *Used* largely as a developer for wet plates, ferrotypes and in the ferrous oxalate developer for plates and bromide paper.

Field, Curvature of.

(*See* **Curvature of Field.**)

Field, Flatness of.

(*See* **Flatness of Field.**)

Field of a Lens—VI.

(*See* **Lens, Field of.**)

Figure Posing—VII.

Figures in Landscape—III.

Film—I.

(*a*) A term applied to the sensitive emulsion or coating on plates and papers. (*b*) Also a term applied to a sensitive emulsion coated on a flexible support. *Used* in Kodaks, and similar cameras, taking the place of sensitive plates.

Film Cameras.

(*See* **Cameras, Film.**)

Film Photography.

The use of camera employing flexible films instead of glass plates.

Films—To Remove from Plates.

(*See* **Acid Hydrofluoric.**)

Filter—III; IX.

(*a*) The process of straining in order to purify a liquid by passing it through a porous substance which retains any impure substances or sediment. An ordinary filter is made by placing filter paper in a funnel. Collodion is usually filtered through tufts of cotton. Gelatin emulsion is forced through chamois skin by pressure. (*b*) Filtering rays of light. (*See* **Color Filters.**)

Filter Paper.

(*See* **Paper Filter.**)

Filtrate.

The liquid which is passed through a filter.

Finder—I, 79–81.

A miniature camera usually placed on the front of a camera for viewing the object which is to be reproduced.

Finder, Direct-Vision.

A finder which is placed on the top of a camera, necessitating the latter being held up to the level of the eye, as the finder is looked through in a straight line toward the subject.

Finger Tips.

Finger tips are made of India rubber and should be employed when working with acids or silver solutions.

Firelight Effects by Daylight—VI, 422–432.

Fire-Proofing Muslin.

One of the greatest inconveniences of flashlight photography is the smoke resulting from the igniting of the flash powder. A smoke bag made of muslin stretched smoothly over a wire

frame, and sufficiently large to allow of the flash being made without fear of touching the cloth, will be found a great convenience. The muslin should, however, be made fire-proof by soaking for at least a half an hour in the following solution:

Water	90 ozs.
Common Salt	2 ozs.
Ammonium Phosphate	5 ozs.

While soaking the muslin the solution should be kept at about 120° Fahr. After soaking hang up to dry. Should the bag become dirty and require washing, it will have to be soaked in the fire-proofing solution again. The flame should not be allowed to reach even the fire-proofed muslin, as there will be danger of its being consumed by smouldering.

Fixed Focus Camera.

(*See* **Camera, Fixed Focus.**)

Fixed Focus Lens.

(*See* **Lens, Fixed Focus.**)

Fixing—I; II; IV; V; IX.

The process of removing the unreduced silver salts from a negative or print. Sodium hyposulphite is generally employed for this purpose. (*See* **Sodium Hyposulphite.**)

Flare.

A defect in a lens when the aperture of a lens shows on the focusing screen as a circular patch of light. When a plate is developed, this spot reproduces practically opaque. This defect will sometimes make its appearance when the camera is pointed in the direction of the sun. It most generally occurs with cheap or inferior lenses.

Flash-Lamp.

A lamp used for igniting flash-powder or magnesium powder.

Flashlight Photography—I; VI; VII.

(*See* **Photography, Flashlight.**)

Flask.

A glass vessel for holding liquids and usually so constructed as to withstand heat.

Flatness.

A photographic term denoting lack of vigor or "snap" in a negative or print. Usually caused by over-exposure or over-development.

Flatness of Field.

The quality of a lens giving uniform definition over the entire surface of the focusing screen or sensitive plate.

Flexible or Temporary Support.

(*See* **Support, Flexible or Temporary.**)

Flint Glass.

(*See* **Glass, Flint.**)

Floral Photography—III.

Flowers.

(*See* **Floral Photography.**)

Fluid Lens.

(*See* **Lens, Fluid.**)

Fluorescence.

An optical term signifying that objects from one point of view appear of a different color or tint from that of another.

Focal Length.

(*See* **Focus, Equivalent.**)

Focal Plane Shutter.

(*See* **Shutter, Focal Plane.**)

Foci.

The plural of focus.

Foci, Conjugate—VI, 611.

A lens has two focal points which have a definite relation, *i. e.,* the points on both sides of the lens at which are situated the object being photographed, on the one side, and the ground-glass or sensitive plate on the other. When reproducing an object actual size, the *conjugate foci* is double the focal length of the lens and both the ground-glass and object will be located this distance from the center of the lens combination.

Focus—I; VI; VII.

An optical term meaning a point in which any number of rays of light meet after being reflected or refracted. An image is said to be in focus when all details are sharp and well defined on the ground-glass.

Focus, Actinic.

The point at which the chemical rays of light are brought to a focus. (*See* **Aberration, Chromatic.**)

Focus, Back—VI.

The distance between the back glass of a lens and the focusing

screen, when a distant object is sharply focused upon the screen.

Focus, Chemical.

The point at which the actinic rays of light are concentrated —distinct from the visual focus.

Focus, Depth of—VI.

The power of a lens to sharply reproduce near and distant objects at the same time. A lens working at full aperture seldom renders near and distant objects perfectly clear at the same time. The use of a stop or diaphragm which will cut off certain rays of light will give greater depth of focus, but requires increased exposure.

Focus, Diffusion of.

When an image is not sharp, or in other words, when the image is dull or spread out, it is said to be diffused. Certain portrait lenses are so constructed as to render a slightly hazy, soft appearance to the portrait, *thus the focus is diffused.*

Focus, Dividing the.

There are times when it is desired to have near and distant objects in sharp focus, but the lens will not sharply cut the objects located at these extremes. The usual course of procedure is to focus on an object approximately midway between the two extremes and then use a stop small enough to have all objects sharply defined. This is termed *dividing the focus.*

Focus, Equivalent—VI.

Focal Length, or Focal Distance.

An optical term applied to a doublet lens. The distance from the optical center of a lens and the ground-glass when focusing on an object over one hundred feet away.

Focus, Principal—VI.

The point at which parallel rays of light meet after having passed through a convergent lens. The distance from the lens to this point is termed the *focal length* of the lens.

Focus, Visual.

The point at which (with any given lens) the most strongly visible light rays come to a focus.

Focusing—I; III; VI; VII.

Focusing Cloth—III, 487.

An opaque cloth to throw over the head and camera to exclude stray rays of light while focusing.

Focusing Glass.

A magnifying lens used while focusing to aid in securing sharpness.

Focusing Scale—III, 465.

A graduated scale fastened to the baseboard of the camera which allows of focusing for any given distance without looking on the focusing screen.

Focusing Screen.

A ground-glass placed in the back of a camera on which the image is cast. The image is focused on this before exposing the plate.

Fog—I; II.

A darkening of the silver salts either all over the plate or in certain portions which should not have been affected by the light.

Fog, Chemical—II, 35, 36, 431.

Fog caused by too energetic a developer—too much alkali in the developer or other spontaneous reduction of the sensitive silver salts independent of the action of light.

Fog, Dichroic.

A difficulty met with in negative making—a deposit on the film which appears red by transmitted light and green by reflected light. Generally due to the plates being old, or through imperfection of manufacture; also to the forcing of development.

Fog, Light.

Caused by the use of an unsafe light in the dark-room; also by defects in the camera or plate-holder, over-exposure or accidental exposure to light.

Forcing.

Bringing out detail in an under-exposed plate by using an additional amount of accelerator during the process of development. Care must be exercised, however, in the addition of an accelerator, for chemical fog is very liable to be caused.

Foreground, Composition in—III.

Forehead, Retouching—X.

Formaldehyde.

(*See* **Formalin.**)

Formalin—CH_2O—II, 805; **IV,** 20.

Formic Aldehyde or Methytic Aldehyde, or Formaldehyde. Clear, colorless liquid with pungent odor. *Use.* Renders

gelatin insoluble to even boiling water and for this reason is used for hardening films, preventing frilling, blistering, etc.

Formula.

A chemical term used to denote the collection of various compounds, together with their quantities, which are required to make up certain solutions.

Formulæ.

Plural of Formula.

Freezing—II.

The changing of a liquid to a solid by the influence of cold.

French Chalk.

(*See* **Chalk, French.**)

Frilling.

The wrinkling or detachment of a film around the edges of plates or paper. Very often happens in hot weather or when using too much alkali in the developer.

Front, Rising and Falling—I, 82, 83; **III.**

A term signifying that the frontboard to which the lens is attached may be raised or lowered in order to secure more sky or foreground without altering the position of the body of the camera.

Front, Swing.

(*See* **Bed, Swing.**)

Frost Photography—III, 420-443.

f System.

(*See* **f.**)

Full Aperture.

The largest available opening of a lens.

Fuller's Earth.

A clay usually of a greenish tint. Absorbs grease and is useful for cleaning purposes.

Fuming.

The process of exposing plates or paper to the fumes of a chemical in order to make them sensitive.

Funnel.

A conical-shaped vessel terminating at the smallest end in a spout. Used for pouring a liquid into a vessel having a small opening. Also for filtering liquids through filter paper.

Furniture, Photographing—VII.

Fusion.

The act of melting or making a solid liquid by means of heat.

Fuzzy Photography—III, 638-665.

G

Gallic Acid.

(*See* **Acid Gallic.**)

Gallon.

An English measure of capacity. It is equal to four quarts.

Gamboge.

A bright-yellow, resinous gum. *Soluble* in both water and alcohol. *Used* in blocking out negatives. (*See* **Dodging in Printing.**)

Gas.

A vaporous substance not condensed into liquid form at ordinary temperature.

Gaslight Paper—I; IV.

A slow bromide paper which can be handled in ordinary gaslight.

Gelatin.

A pure, brittle, transparent, tasteless glue. Swells in cold water, but will not dissolve until heated. The melting point varies with the quality of the gelatin. One of the most useful materials employed in photography. Practically all plates are coated with an emulsion whose basis is gelatin; also used in the emulsions on various sensitive papers.

Gelatin Papers—IV.

General Fog.

(*See* **Fog.**)

Genre Work—III, 255.

A term used with reference to the representation of some phase of common life, such as a rural or village scene. It of necessity must include one or more human figures. It is entirely foreign to portraiture as commonly considered, for the subject should be occupied with some familiar work. In brief it is producing *a picture that tells a story.*

Glass.

A hard, brittle, transparent substance used as a support for dry plate emulsions, in manufacturing of lenses, etc.

Glass Cement.

Heat equal parts of gutta percha and shellac on a sand-bath until melted. This cement can be used for cementing glass to glass or to metal. Use hot; also have glass or metal hot.

Glass, Crown.

Made the same as ordinary window glass with the exception that greater care is exercised in carefully selecting the various materials for making it.

Glass, Flint.

Manufactured in a similar manner to other kinds of glass, but possesses a very high refractive and dispersive power.

Glass, Jena—VI.

So called because it originated in Jena, Prussia. It is especially valuable for the manufacture of high-class lenses, on account of the quality of the various ingredients employed in its manufacture, which render almost any desired degree of refraction or dispersion.

Glass, Optical.

Made of both flint and crown glass, and lenses constructed of both kinds and placed together overcome chromatic aberration.

Glass, Photographing—VII.

Glass, Plate.

Manufactured by an entirely different process from either crown or flint glass and is especially adapted for use in large windows on account of its strength and toughness.

Glass, Ruby—II.

Glass of a reddish or, properly speaking, *ruby* color. Being a non-actinic medium it is used in the lamp for illuminating the photographic dark-room.

Glass, Writing on.

When desired to write on glass or place labels upon glass bottles, hydrofluoric acid is generally used. A fine brush dipped in the acid will eat into the glass, leaving an etched surface.

Glucose—$C_6H_{12}O_6$.

Grape Sugar, Dèxtrose.

White (Anhydrous) powders. A variety of sugar found in the grape and other fruits. *Used* in some dry-plate emulsions as a preservative and to keep the emulsion moist; also used in silvering glass.

Glue.

An impure kind of gelatin. Should not be used for mounting photographs as it is liable to stain the prints.

Glycerine—$C_3H_8O_3$.

Clear, colorless, syrupy liquid; sweet and warm taste. *Used* to render gelatin films flexible and flat. Employed for local treatment in development of platinum and bromide prints.

Glycin—$C_2H_5NO_2$—**II,** 524.

Glycocoll.

A light, lustrous powder. *Soluble* in water providing the water has been made alkaline. *Uses.* It is a powerful but slow acting developer. Gives clear images of a grayish-black color. Especially valuable for copying and photo-mechanical work.

Goerz Lenses and Cameras—VI.

Gold—Au.

A yellowish-brown metal. Toning prints with gold consists of depositing a thin layer of metallic gold on the surface of the print. Gold is used in photography only in conjunction with other chemicals.

Gold Chloride—$AuCl_3 + HCl + 4H_2O$—**IV,** 51.

Gold Trichloride.

Yellow crystals. Obtained by dissolving gold in aqua regia (*See* **Aqua Regia**). Usually sold in tubes containing 15 grains and is dissolved in 15 drams of water so that each dram of solution contains 1 grain of gold chloride. *Used* extensively for toning of silver papers.

Gold Toning—IV.

The changing of the color of a printed-out silver print by replacing the silver image with metallic gold—the particles of gold in the bath taking the place of those of silver in the image.

Graduate.

A conical-shaped glass with a graduated scale on the side for measuring solutions.

Grain.

(*a*) The texture of dry-plate emulsion, or of sensitized paper.
(*b*) The unit of English weight.

Gramme.

The standard unit of metric measure of weight. It is the weight of a cubic centimeter of distilled water at 32 degrees Fahr.

Grape Sugar.
(*See* **Glucose.**)

Gravure Effects—IV.

Green Fog.
(*See* **Fog, Dichroic.**)

Ground-glass.
(*See* **Focusing Screen.**)

Ground-glass Substitute (Solution)**—IV,** 1102-1109; **X.**

Group—I, 692; **III; VI; VII; IX.**

Gum Acacia.
(*See* **Gum Arabic.**)

Gum Arabic.
Gum Acacia.
Colorless when pure, but the commercial variety has a yellowish tint. Does not keep well. Dissolves in two parts water. Is insoluble in alcohol. *Used* as a mountant. Salicylic acid may be used as a preservative. Sometimes employed in gum bichromate process.

Gum Bichromate Process.
Similar to the carbon process, in which gum or glue is employed as a vehicle for holding the sensitive materials.

Gum Dammar.
(*See* **Damar.**)

Gum Mastic.
Clear, white, or slightly yellow, "tears" about the size of small peas. *Soluble* in alcohol, ether or chloroform. *Used* in retouching mediums, etc.

Gum Sandarac.
Yellowish crystals. *Soluble* in alcohol and ether. *Used* for varnishes, for translucing paper, etc.

Gun Cotton.
(*See* **Pyroxylin.**)

Gutta Percha.
Grayish or yellowish sticks, frequently with reddish-brown streaks; hard, and rather leathery or horny; becomes very soft if placed in boiling water. Only slightly *soluble* in alcohol, ether and benzine. *Used* for photographic dishes; also bottles to contain hydrofluoric acid.

Gutta Percha, Cement for.

Gutta Percha	2 drms.
Carbon Bisulphide	1 oz.
India Rubber	1 drm.
Fish Glue	5 drms.

Gypsum.

(*See* **Calcium Sulphate.**)

H

Halation—II; III; IX.

A term used to express the blurred effect which takes the appearance of a halo around brightly lighted portions in a negative, caused by reflections from the back of a glass plate or by lateral spreading of light in the film. The defect is particularly noticeable when brilliantly lighted objects appear quite close to deep shadows. A common example of halation is found when making an interior and a window comes into the view. Both the cause and remedy for halation are thoroughly described in the text of the library, as referred to above.

Half-Plate.

English method of denominating a certain size of sensitive plate. The half of a *whole* plate would be about 6½ x 4¼, but the standard *half plate* as used in England, principally, is 6½ x 4¾.

Half-Tone.

(*a*) The shades or tints between the highest points of light and the deepest shadows of an image; (*b*) a copper or zinc plate on which is made a reproduction of a photograph, the half-tones being represented by fine dots. Used for illustrating books, newspapers, etc., the reproduction being in one color of ink.

Halogen.

A term used to describe the four elements, bromine, chlorine, fluorine and iodine. These four elements form salts which greatly resemble each other and have other similar properties.

Haloid Salts.

(*See* **Salts, Haloid.**)

A name given to the salts formed by the combination of a metal with a halogen element. For instance, the union of

chlorine with silver forms silver chloride and is, therefore, a haloid salt of silver.

Hammer Plates—II.

Hand Camera.

(*See* **Camera, Hand.**)

H. & D.

Hurter & Driffield System.

A system which has been almost universally adopted in England for testing the sensitiveness of photographic plates. Originated by the two scientists, Hurter & Driffield.

Hardener—I, 205; **II; IV,** 20, 107.

A solution employed for hardening gelatin negatives and papers. Especially valuable in hot weather. Alum, sulphites, formalin and other chemicals have the effect of hardening gelatin.

Hardness.

(*See* **Chalkiness.**)

Harmony—III, 215.

Any arrangement or combination of relative parts or elements that is consistent or is æsthetically pleasing; agreement of particulars according to some standard of consistency or to æsthetic judgment; an accordant, agreeable, or suitable conjunction or assemblage of details; concord; congruity. *Harmony* is to be distinguished from symmetry: thus, in a *symmetrical* building two opposite wings are exactly identical, though usually with the architectural members in reverse order, while in a *harmonious* building the two wings need not be identical in a single detail, if they balance each other so as to form, taken together, a pleasing and consistent whole. —(*Century Dictionary.*)

Hard Water—IV, 251.

(*See* **Water.**)

Head Rest.

An apparatus constructed out of iron. *Used* for supporting the head in order to prevent movement of the subject during exposure.

Hectogramme.

A Metric weight or measure containing 100 grammes.

Hectoliter.

A Metric measure of capacity for liquids.

Hectometer.

A Metric measure of length.

Heliar.

(*See* **Lens, Heliar.**)

Heliotype.

A modification of the collotype process.

High-Lights—VI; VII; X.

An art term denoting portions of a picture which have received the greatest amount of light; *i. e.*, that part of the subject on which the light has been concentrated. In the negative these portions are the densest or most opaque.

History of Photography—I, Pages 30–39.

Hogarth's Line of Beauty—III.

A very common form of composition, based upon the curved form of the letter S.

Holder, Plate—I, 91–94.

A case in which the sensitive plate is carried. After the image has been focused on the ground-glass the plate-holder is inserted in position, the slide which protected the surface of the sensitive plate is withdrawn, and the exposure made, after which the slide is replaced and the holder withdrawn SINGLE plate-holders accomodate only one plate, while in the DOUBLE plate-holder two sensitive plates may be placed.

Holder, Roll.

An attachment usually employed for holding roll films. It consists principally of a wooden box having a spool in each end. The film is unwound from one spool onto another to a sufficient length to allow of an unexposed section being presented for exposure. The front or opening of the holder is covered with a slide, when not in use.

Hollinger Lighting—VII.

Horizontal Swing—III, 67.

(*See* **Back, Swing.**)

Hurter & Driffield System.

(*See* **H. & D.**)

Hydrochloric Acid.

(*See* **Acid, Hydrochloric.**)

Hydrofluoric Acid.

(*See* **Acid Hydrofluoric.**)

Hydrogen—H.

The lightest of all elements and one of the most important. It is a gas and is taken as the unit for atomic weights. It is one of the elements of water, and the gas in combustion with oxygen gas is used as an illuminant for stereopticons, enlarging lanterns, etc.

Hydrogen Chloride.

(*See* **Acid Hydrochloric.**)

Hydrogen Dioxide—H_2O_2.

Hydrogen Peroxide.

Colorless, slightly acidulous liquid. An excellent disinfectant. Is a powerful bleaching agent. *Used* to remove stain from paper and also as a hypo eliminator.

Hydrogen Peroxide.

(*See* **Hydrogen Dioxide.**)

Hydrofluoride.

(*See* **Acid Hydrofluoric.**)

Hydrometer—I, 267–269; **II,** 53.

An instrument for ascertaining the specific gravity or relative density of liquids for photographic work. The zero point should appear at the surface when the hydrometer is placed in distilled water at a temperature of 58 degrees Fahr. Each degree marked downward indicates a density equal to 1% of common salt.

Hydroquinon—$C_6H_6O_2$—**II; IV; V.**

Hydrochinone or Hydrokinone; also Quinol.

Colorless crystals. One of the most valuable of developing agents. May be used repeatedly. Gives negatives of a blue-black color. Tends to give harshness and, therefore, is useful in copying. Hydroquinon combined with metol makes an excellently balanced developer for general work, as metol tends to produce flatness.

Hypergon Lens.

(*See* **Lens, Hypergon.**)

Hypo—II; IV; V; IX.

An abbreviation for sodium thiosulphate, commonly called sodium hyposulphite. (*See* **Sodium Hyposulphite.**)

Hypo Eliminator.

A solution or chemical used for the removal of sodium hyposulphite. The process is one which changes the hypo to a less injurious compound and also makes it possible to easily

remove the hypo from either plates or papers. In using a hypo eliminator great care must be exercised that the directions be followed implicitly; otherwise even more objectionable compounds than hypo may be formed. Where time is not a controlling factor washing is the best of all hypo eliminators. (*See* Eau de Javelle.) An excellent hypo eliminator is a saturated solution of alum. The best chemical destroyer of hypo is potassium percarbonate. Rinse the plate after taking it from the fixing bath and then place in a tray half full of water and add 6 grains of potassium percarbonate for every 4 x 5 plate. Rock the tray. Remove the negative when the liquid ceases to effervesce. Wash for five minutes.

Hyposulphite of Soda.

(*See* **Sodium Hyposulphite.**)

I

Ice—II, Page 364.

Water frozen into a solid mass. Water expands when in the act of freezing. Ice is very essential in warm weather for keeping the various photographic solutions cool. Various freezing mixtures can be used as substitutes for ice. (*See* **Ammonium Nitrate.**)

Illumination—VI; VII.

The amount of illumination of a surface depends upon the distance of that surface from the light. In fact it varies inversely as the square of this distance. *Ex.* If a certain quantity of light falls upon a certain area at a distance of 6 inches from the illuminant, the same quantity of light will cover four times that area if the distance be increased to one foot; 9 times at a distance of 18 inches; 16 times at a distance of 2 feet, etc. This same principle is carried out, of course, in contact printing or enlarging, and if an exposure of one second is necessary at a distance of one foot from the source of illumination, 4 seconds will be required at 2 feet, etc.

Image—II; VI.

An optical term denoting the picture thrown by the lens upon the focusing screen or sensitive plate. When the light acts upon the sensitive plate in the camera, it forms an *invisible image* (also termed latent image). This is rendered visible by the chemical action of the reducing agent, such as a developer. When visible it is called a *photographic image.*

Image, Double.

A blurred or double image is generally registered on the plate when the camera is moved during the exposure.

Image, Latent.

The name given to the *invisible image* formed by the action of light coming through the lens in the camera and affecting a sensitive photographic plate. The image is rendered visible upon the application of a developer (reducing agent).

Image, Reversal of.

(*a*) An effect produced by extreme over-exposure of a sensitive plate and the action of light which produces a positive instead of a negative. (*b*) An image is also reversed by means of a prism which is placed in front of the lens. It is, of course, necessary that the object be located at right angles to the direction in which the lens is pointed in order that it may fall properly upon the prism. The image will then be cast upon the lens in a reverse manner than when the prism was not employed; therefore, the resulting image on the sensitive plate will be reversed. The prism is used principally in photo-mechanical work.

Incidence, Angle of.

The angle formed by a ray of light falling on a flat surface with a line perpendicular to that surface.

Incidence, Line of—VI.

A straight line formed by a ray of light moving toward a plane surface.

Index of Refraction.

(*See* **Refractive Index.**)

India Ink.

An ink composed of exceedingly fine lampblack. Sold in sticks and cakes. *Used* for spotting negatives and prints, also for working up bromides, etc.

India Rubber.

Caoutchouc.

A compound of hydrogen and carbon. A juice obtained from the India rubber tree. *Used* in making rubber tubing, squeegees and other photographic accessories. Combined with sulphur forms ebonite, vulcanized rubber, etc., in which form it is used in the manufacture of trays, slides for plate-holders, etc.

India Rubber Solution.

(*See* **Solution, India Rubber.**)

Indigo.

A vegetable coloring matter. Dark, copperish-red, semi-metallic mass. When powdered, is deep blue in color. *Insoluble* in water, cold alcohol or ether; slightly soluble in boiling water; very soluble in sulphuric acid. *Used* in preparing various solutions for chemical tests.

Infinity Point.

An optical term denoting the point at which a lens may be set when focusing on an object far enough removed from the camera so that the rays of light proceed towards the lens in practically a parallel manner. This distance must be over 100 feet. When the lens is at this point, all objects within certain definite limits will be perfectly sharp on the plate or ground-glass. The distance from the lens to the nearest object that will be sharp when the lens is set at the point of infinity, varies with the aperture and focus of the lens, but it may be assumed to be 50 times the focus of the lens with a stop at F. 8. All objects beyond this point will be in focus. The smaller the aperture, the nearer to the lens will objects be in focus.

Ink, White—V, 999; **X.**

Gum Arabic, ½ ounce; water, 2 ounces. Strain through muslin and then add a sufficient amount of zinc white to make the ink smooth. If too thick, dilute with water. Add a few drops of carbolic acid as a preservative.

Inorganic Chemistry.

(*See* **Chemistry, Inorganic.**)

Instantaneous—I; II.

Very speedily; done in an instant. The making of an exposure of rapidly moving objects. The camera may be held in the hand during the exposure and a perfectly sharp record obtained of the object in motion.

Instantaneous Dry Plates.

Plates coated with a very highly sensitive emulsion, and that will allow of the use of an extremely rapid exposure.

Instantaneous Shutter.

(*See* **Shutter, Instantaneous.**)

Insurance, Studio—VIII.

Intensification—I; II.

A chemical process in which the density or contrast of a negative or print is increased by means of an intensifying solution.

Intensifier, Silver.

Prepare the following solution:

Pyrogallic Acid	3 grs.
Acetic Acid	6 drops.
Citric Acid	1 gr.
Water	1 oz.

To this add two or three drops of a 20 grain solution of silver nitrate. The silver nitrate solution must not be added, however, until the time of using. With this solution any degree of density may be obtained, and care must be taken not to intensify too much, as the color of the film becomes very non-actinic. If the solution remains on the plate for any length of time it will cause stain; therefore, immediately after intensifying, the plate should be thoroughly washed and then dried slowly. Although the acid has a tendency to cause frilling of the film, there will be little danger from this source if the temperature of the solution is maintained at a moderately low degree—50° to 65° Fahr.

Intensity Ratio.

The relation of the diameter of the aperture of the lens to its focal length. The focal length divided by the diameter of the stop equals the *intensity ratio.*

Interiors—III; VI; IX.

Invisible Image.

(*See* **Image, Latent.**)

Iodide of Ammonium.

(*See* **Ammonium Iodide.**)

Iodide of Cadmium.

(*See* **Cadmium Iodide.**)

Iodide of Potassium.

(*See* **Potassium Iodide.**)

Iodide of Silver.

(*See* **Silver Iodide.**)

Iodine—I.

Bluish-black friable plates; metallic luster; peculiar odor; sharp acrid taste. *Soluble* in a solution of potassium iodide; carbon disulphide; chloroform. *Use:* Vapor of iodine was employed as a sensitizer by Daguerre for his silver plates. In combination with other compounds iodine is used in sensitive emulsions.

Iodine, Tincture of.

Made by dissolving iodine in alcohol. *Used* to remove stains of silver nitrate, first touching the stains with tincture of iodine and then with potassium cyanide or hypo.

Iris Diaphragm—I, 58; VI.

(*See* **Diaphragm Iris.**)

Iron—Fe.

A metal of a grayish, luster-like color. *Use*: Various salts of iron are used in photography, especially in the iron printing processes, such as blue-print process (ferro-prussiate), the platinum process, etc. The word ferrous or ferric is often used in place of the word iron. The ferrous salts contain more oxygen than the ferric.

Iron Ammonium Citrate.

(*See* **Ferric Ammonium Citrate.**)

Iron Chloride.

(*See* **Ferric Chloride.**)

Iron in Water—IV, 250.

(*See* **Water Tests.**)

Iron Nitrate.

(*See* **Ferric Nitrate.**)

Iron Oxalate.

(*See* **Ferrous Oxalate.**)

Iron Perchloride.

(*See* **Ferric Chloride.**)

Iron Sulphate.

(*See* **Ferrous Sulphate.**)

Isochromatic.

A term applied to sensitive emulsions which are prepared to render correctly relative color values. (*See* **Orthochromatic.**)

Isochromatic Plates—II; III.

J

Japan Varnish.

An asphaltum varnish.

Javelle Water.

(*See* **Eau de Javelle.**)

Jena Glass.
(*See* Glass, Jena.)

Jew's Pitch.
(*See* Asphaltum.)

Juvenile Portraiture—VII.

K

Kallitype Process—I.
A printing process quite popular, especially among amateur photographers. Similar in principle to platinum printing process. The action of light changes the ferric oxalate to ferrous oxalate and the latter salt when in solution reduces the silver nitrate to metallic silver, resulting in bluish-black or black images.

Kilo or Kilogramme.
A metric measure of weight.

Knife, Etching—X.

Kodak—I; V.
A trade name used by the Eastman Kodak Company and applied to both the *box* and *folding* cameras made by that concern.

Kodoid Plates—I, 211, 212.

L

Labeling Glass Bottles.
(*See* Glass, Writing on.)

Laces, Photographing—VII.

Lacquer.
A varnish composed chiefly of shellac dissolved in alcohol, colored with dragon's blood, gamboge, etc.

Lamp.
There are various forms of lamps used in photography for dark-room illumination. In all cases, however, it is essential that the light, in order to be perfectly safe for handling sensitive plates, consist of a deep ruby as well as an orange glass or similar material, either paper or cloth, which will give identical results.

Lampblack.

A fine carbon formed by the condensation of the smoke of burning oil, pitch, or resinous substance, in a chimney terminating in a cone of cloth. Lampblack is a basis for the majority of black ink colors, and as it is permanent is used in the carbon process.

Lamp, Flash—I, 688; **VI; VII; IX.**

Flashlamps are of various forms and construction, the most important of which are thoroughly described in the text.

Landscape, Figures in—III.

Landscape Lens.

(*See* **Lens, Landscape.**)

Landscape Negatives, Retouching—X.

Landscape Photography—III.

Lantern, Optical.

(*See* **Optical Lantern.**)

Lantern Plates.

(*See* **Plates, Lantern.**)

Lantern-Slides.

(*See* **Plates, Lantern.**)

Lantern-Slides, Coloring—V, 1007–1028.

Latent Image.

(*See* **Image, Latent.**)

Latitude of Exposure.

(*See* **Exposure, Latitude of.**)

Lavender, Oil of.

A volatile oil. *Used* in photo-mechanical processes chiefly as a solvent for asphaltum. A solvent for pyroxylin, also employed in shellac varnishes as a solvent for the shellac.

Lead—Pb.

A bluish-gray, soft metal. *Soluble* in nitric acid. *Useful* for lining wooden sinks. Hypo will not affect it. Lead forms several salts, some of which have photographic uses.

Lead Acetate—$Pb(CH_3COO)_2 + 3H_2O$.

Acetate of Lead, Sugar of Lead.

Efflorescent, colorless, shiny, transparent crystals; sweet metallic taste; highly *poisonous*. Employed in toning baths and sometimes as a hypo eliminator.

Lead Chromate—$PbCrO_4$.

Chromate of Lead or Chrome Yellow.

Brownish-black lumps or brown powder. *Soluble* in acids. *Used* in opaques and paints as a coloring material.

Lead Nitrate—PbN_2O_6.

Nitrate of Lead, or Plumbic Nitrate.

White, translucent crystals. *Soluble* in water. *Used* with potassium ferricyanide as a negative intensifier.

Lead Toning.

Acetate of lead is sometimes used in a toning bath for silver printing-out papers, but as its permanancy is questionable its use is not recommended.

Leather, Blacking for—VI.

(*See* **Varnish.**)

Leather, Cement for.

Dissolve guttapercha in carbon disulphide, having it of a syrupy consistency. Use hot.

Length of Focus.

(*See* **Focus Equivalent.**)

Lens—I; V; VI.

A transparent body generally made of glass, having surfaces either spherical or plane, constructed for the purpose of concentrating or scattering rays of light. The various forms of construction are fully treated of in the text.

Lens, Achromatic—VI.

Achromatic means destitute of color. An achromatic lens is one composed of two or more glasses, which so control the *color* rays of light as to bring them to the same focal point as the *visual* rays of light.

Lens, Anastigmat—VI.

A lens free from astigmatism. (*See* **Astigmatism.**)

Lens, Aplanatic—VI.

A lens practically free from spherical and chromatic aberration when used at a large aperture.

Lens, Apochromatic—VI.

A lens constructed for use in three-color work and color photography, being free from chromatic aberration.

Lens, Back Combination.

The portion of a doublet lens located nearest the ground-glass. In most cases, when used without the front combination, it

has a focal length almost double that of the complete lens combination and will produce an image practically double the size of that obtained by the complete lens.

Lens, Biconcave.

Double-Concave, Concaval-Concave.

A term applied to a lens thinner in the center than at the margin and having both sides hollowed out.

Lens, Biconvex.

Double-Convex, Convexo-Convex.

A term applied to a lens thicker in the center than at the margins, and having both sides extending outward in the form of a sphere.

Lens, Celor—VI.

A highly corrected anastigmat lens, having a large aperture. Manufactured by Goerz.

Lens, Collinear—VI.

An anastigmat lens having large aperture and great covering powers. Manufactured by Voigtländer.

Lens, Concave—VI.

A lens hollowed or depressed in the center.

Lens, Concave, Double.

Biconcave or Concaval-Concave.

A lens in which both sides are hollow or concave.

Lens, Concave, Plano.

A lens having one side hollowed out, the other being plane or flat.

Lens, Concavo-Convex.

A lens hollow on one side, the other being raised or convex.

Lens, Convergent—VI.

A lens which will bring the rays of light to meet in a focus—a convex lens.

Lens, Convertible—VI.

A lens in which the various combinations may be arranged differently, or used separately, thus giving different focal lengths.

Lens, Convex—VI.

A lens the surface of which is in the shape of a sphere, the center being thicker than the margin.

Lens, Convexo-Concave.

A lens convex on one side and concave on the other.

Lens, Convex, Double.

A lens which is convex on both sides.

Lens, Convex, Plano.

A lens convex on one side and plane on the other.

Lens, Cooke—VI.

An anastigmat lens constructed of two lens combinations and a third single lens. Manufactured by Taylor, Taylor & Hobson.

Lens, Covering Power of—VI.

A term which signifies the field or area of illumination of a lens; *i. e.,* practically speaking, the size of a plate a lens will cover, or on which a well-defined image will be reproduced.

Lens, Dagor—VI.

A highly corrected anastigmat lens. Manufactured by Goerz.

Lens, Dallmeyer—VI.

One of the first types of portrait lenses, and still a favorite with many portrait photographers. Manufactured by Dallmeyer.

Lens, Doublet.

A lens composed of two separate combinations.

Lens, Dynar—VI.

The name applied to a highly corrected anastigmat lens. Manufactured by Voigtländer.

Lens, Enlarging—VI.

Lens, Euryscope—VI.

A rectilinear lens having a large aperture. Used for portraiture as well as for landscape work. Manufactured by Voigtländer.

Lens, Field of—VI.

The illuminated space on a screen made by a lens working with full aperture. If the corners of a negative are transparent, the field of the lens is not large enough for that particular size of plate.

Lens, Fixed Focus.

A lens is said to have a *fixed focus* when near and distant objects are in focus on the ground-glass at the same time, thus doing away with the necessity of altering the distance between the lens and the sensitive plate. Only lenses of short focal length, therefore (lenses made to cover plates not larger than 4 x 5 inches), can be termed fixed-focus lenses. Objects nearer than 6 feet will, however, be more or less blurred

(out of focus). Only the cheap forms of cameras are fitted with fixed-focus lenses, and it is seldom that these are made for plates larger than 3¼ x 4¼ inches.

Lens, Fluid.

A lens constructed of optical glass filled with distilled water.

Lens, Heliar—VI.

A name given to an anastigmat lens manufactured by Voigtländer. Works at a large aperture and is especially adapted to portrait work.

Lens, Hood—VI; VII.

Lens, Hypergon—IX.

A wide-angle lens, embracing the enormous angle of 135°. Manufactured by Goerz.

Lens, Landscape.

Achromatic, Single, or View Lens.

A lens consisting of a biconvex crown glass cemented to a biconcave flint glass. Corrected for chromatic aberration, but not for curvilinear aberration or distortion.

Lens, Medium Angle.

(*See* **Angle, Normal.**)

Lens, Meniscus.

A lens which is convex on one side and concave on the other, and thicker in the center. A sectional view of the lens has the appearance of the moon in its first quarter.

Lens, Narrow Angle.

(*See* **Angle, Narrow.**)

Lens, Negative.

A lens having greater concavity than convexity.

Lens, Orthostigmatic.

A lens whose single combinations are free from astigmatic, chromatic and spherical aberration.

Lens, Petzval.

One of the earliest forms of portrait lenses. It is very rapid, but gives poor marginal definition and the various aberrations are quite marked.

Lens, Planar.

An anastigmat lens manufactured under the Zeiss patents. It embraces a comparatively wide angle, is very rapid, and highly corrected for the various aberrations.

Lens, Plastigmat—VI.

An anastigmat type of lens manufactured by Bausch & Lomb.

Lens, Portrait—VI; VII, 88–90.

A lens specially constructed for portrait work, the principal requirements being that the lens be one of long focus and work with a large aperture, thus giving great speed.

Lens, Positive—VI.

Any lens which causes rays of light to converge; capable of forming a real image.

Lens, Projection—VI.

A lens which gives perfectly rectilinear lines and especially adapted to enlarging and lantern projection.

Lens, Protar—VI.

The name for a particular form of anastigmat lens originated by Zeiss. Manufactured in the United States by Bausch & Lomb.

Lens, Rapid.

A lens whose working aperture is large as compared with its focal length is termed a *rapid lens.* In fact, any lens allowing a large number of rays of light to pass through to the sensitive plate is a rapid one. The greater the rapidity of the lens the less is the depth of focus and definition, and for this reason any adjustment which increases the rapidity of the lens necessarily tends to decrease the depth of focus.

Lens, Rapid Rectilinear—VI.

A lens having a fairly large working aperture and free from distortion, having been corrected for spherical aberration, thus giving straight lines; *i. e.,* the lines of buildings or similar objects are correctly reproduced, not distorted. (*See* **Lens, Rectilinear.**)

Lens, Rapid Symmetrical—VI.

A rapid rectilinear lens, the two combinations of which are of the same focal length and of identical construction.

Lens, Rectigraph.

A synonymous term for the rectilinear lens.

Lens, Rectilinear—VI.

A lens in which straight lines are rendered perfectly on the sensitive plate; *i. e.,* straight lines are not curved or distorted. A rectilinear lens works with a fairly large aperture, and for all around work, where speed is not the essential requirement, the rectilinear type of lens is of great value.

Lens, Single.

A lens in its simplest form, usually constructed of only one piece of glass. If the lens is achromatic it may be made of two or more glasses cemented together. These glasses have different refractive and dispersive power. Single lenses will not give straight lines, and, therefore, are not available for architectural work. Their chief use is for landscape work. In the majority of cases it is necessary to use a very small aperture in order to cut out the marginal rays of light which would give a distorted image.

Lens, Sizes of.

Quarter size—for 3¼ x 4¼ plates.
Half size—for 4¾ x 6½ plates.
Whole plate, or 4-4—for 6½ x 8½.
Other lenses expressed by inches, according to the plate they are made to cover.

Lens, Stigmatic.

A lens free from astigmatism; also corrected for chromatic and spherical aberration. Gives an image having a perfectly flat field when worked even with a large aperture.

Lens, Supplementary—I, 604–621; **V,** 528–532.

Single lenses made for various purposes to slip over (similar to a cap) the ordinary lens. They either shorten or lengthen the focus of the ordinary lens.

Lens, Symmetrical—VI; IX.

A rapid rectilinear lens, the two combinations of which are of identical construction, and when used separately have a focal length almost double that of the combined lens.

Lens, Telephoto—I, 611; **VI.**

An attachment consisting of a tube and a negative lens, which is used in conjunction with the positive lens for photographing objects situated at considerable distance from the camera. A telephoto lens magnifies objects in the same manner as a telescope.

Lens, Tessar—VI.

The name given to a highly corrected anastigmat lens which works at a large aperture, originated by Zeiss. Manufactured in the United States by Bausch & Lomb.

Lens Tests—I; VI.

The majority of lenses of reputable make are practically free from defects—at least they may be relied upon so far as guaranteed or described by the manufacturer. The following

tests will, however, prove of value, should one desire to ascertain the value of a lens or to test it while having it on a few day's trial:

Astigmatism.—Cut a circular disc of white paper about three inches in diameter, and attach it to a black background. Focus this disc on the center of the ground-glass. Turn the camera until the disc is seen at the margin of the plate. If it is indistinct, and on attempting to focus it spreads out horizontally or vertically (becomes oval in shape), the lens has not been corrected for astigmatism.

Centering of Combination.—To learn whether the different combinations of a lens have been properly mounted and centered, hold the lens at arm's length and about two feet from a candle flame. If the lens cells have been properly mounted, the images of the flame in the different glasses will be one behind the other. By slightly turning the lens from one side to the other you will be able to carry out this test successfully.

Chromatic Aberration.—Place three white cards, about two inches apart, one behind and slightly above the other, lettering each with a black letter. Focus on the middle card, having the camera about four feet distant. Expose a plate and develop it. If the center card is not the sharpest the lens is not properly corrected for chromatic aberration.

Covering Power.—To test for covering power place the lens in a large camera. Without stopping the lens down at all it should sharply and evenly cover an area on the ground-glass equal to the size for which it is listed; *i. e.,* if the lens is listed to cover a 5 x 7 plate the corners, as well as the sides, of a space on the ground-glass of 5 x 7 inches in size should be perfectly sharp.

Curvilinear Distortion.—Focus the corner of a building sharply on the center of the ground-glass (any straight upright object will answer). Turn the camera until the corner of the building is brought to the edge of the ground-glass. The lens has not been corrected for this distortion if the edge of the building is not perfectly straight.

Flare.—Flare, which is a round, semi-opaque spot appearing in the center of a developed plate, may be tested for by pointing the camera to a strong light. If a circular patch of light appears on the ground-glass the lens has not been corrected for flare.

Flatness of Field.—This may be tested for in the same manner as curvilinear distortion, the image remaining per-

fectly sharp at the edges of the ground-glass after the camera is rotated.

Focal Length.—To find the focal length of a lens, carefully focus it on a distant object—one at least 150 feet away. The distance from the center of the lens combination to the ground-glass is the approximate focal length of the lens.

Glass, The.—To test the quality of the glass remove one of the lens combinations and place it on a sheet of pure white paper. There should be no perceptible color, as the least trace of yellow is extremely detrimental, for it reduces the speed of the lens to a considerable degree. The surfaces of the lens glasses should be free from scratches and have a high polish. Minute air bubbles occur in the highest grade of lenses, but if these bubbles are not large, nor occupy a central position in the lens, they are not detrimental.

Spherical Aberration.—Securely fasten a sheet of newspaper to a perfectly flat surface, and then sharply focus the camera in the center. If upon examining the sides of the paper the letters are indistinct and blurred, the lens has not been corrected for spherical aberration.

Lens, Triple Convertible.

A lens in which the various combinations or cells may be used separately, thus giving different focal lengths. A *triple convertible lens* is one in which it is possible to have three different focal lengths. (*See* **Lens, Unsymmetrical.**)

Lens, Triplet.

A lens constructed of three separate combinations of glasses.

Lens, Unar—VI.

An anastigmat portrait lens of high quality, originated by Zeiss. Manufactured in the United States by Bausch & Lomb.

Lens, Unsymmetrical.

A rectilinear lens in which the two combinations have different focal lengths. One of the single lenses will give an image about double that obtainable with both cells in combination, while the other cell will give an image ⅓ larger than the former cell.

Lens, Wide-Angle—VI; IX.

A lens embracing a wide angle of view. (*See* **Angle of View.**)

Level—III, 518, Page 232; **IX.**

A small instrument used to determine whether the base of the camera is perfectly horizontal.

Light, Chemical Action of—VI.

In photography, the blue and violet rays exercise the greatest chemical action, while the red and yellow rays have the least amount of chemical effect upon sensitive substances.

Light, Continued Action of.

In some printing processes the chemical action of the light continues even after the paper is printed and has been placed in the dark. This is the case in the carbon process.

Light, Decomposition of.

A ray of white light is decomposed on passing through a prism, *i. e.,* separated into its constituent color rays.

Light, Diffusion of—VI.

Light which is not direct or is spread out—*i. e.,* light in the shade of a building—is termed diffused light. Ground-glass on a skylight produces diffused light in a studio.

Light Filter.

(*See* **Color Filter.**)

Light for At-home Portraiture—VI.

Light for Portraiture—VII.

Light for Printing—II, 19; **IV.**

Light, Pencil of.

An optical term applied to rays of light converging or diverging from a point.

Light, Ruby—I; II.

A non-actinic source of light for illuminating the dark-room. When made of proper material this light can be used with safety for handling and developing all ordinary dry plates. But, trichromatic and panchromatic plates must be handled either in total darkness, or a specially prepared green safe light.

Lime Chloride—$Ca(ClO)_2 + CaCl_2 + 2H_2O$.

Bleaching Powder or Lime Chlorinated.

Deliquescent white powder; unpleasant saline taste. Partly *soluble* in water. A bleaching and disinfecting agent. *Used* as a hypo eliminator; also in toning baths.

Lime Light.

Light produced by a jet of combined oxygen and hydrogen gas, being thrown upon a cylinder of lime, producing a dazzling white light.

Linear Perspective.

(*See* **Perspective.**)

Line of Beauty—III.

Lips and Chin, Retouching—X.

Liquid Ammonia.

(*See* **Ammonia.**)

Liquids, Diffusion of.

The gradual mixing or diffusing of one liquid into the other when placed in contact with each other.

Litmus Paper.

(*See* **Paper, Litmus.**)

Liter.

A Metric measure of volume.

Local Intensifying—II.

Local Reducing—II.

Long Focus—IX.

The term which signifies that the distance between the lens and sensitive plate is greater for a particular size negative than a lens of short focus. Such a lens embraces a narrow angle. (*See* **Angle of View.**)

Lumière Process.

A process of color work named after the inventors; also called the AUTOCHROME PROCESS.

Lunar Caustic.

(*See* **Silver Nitrate.**)

Lunar Photography.

Photographing the surface of the moon.

M

Machinery, Photographing—IX.

Various methods of photographing machinery are taken up in the text. The following formula produces an excellent paint for dulling bright surfaces:

White Lead (dry)	2½ lbs.
Lampblack	1 to 3 ozs.
Gold Size	½ pt.
Turpentine	¾ pt.

The amount of lampblack used depends upon the subject as well as the lighting. Apply the paint in the ordinary manner.

After the exposure is made the paint may be removed with waste or rags saturated in turpentine.

Magazine Camera.

(*See* **Camera, Magazine.**)

Magic Lantern.

(*See* **Optical Lantern.**)

Magnesium—Mg—**VI.**

Lustrous, silver-white, malleable, moderately hard metal; burns with brilliant white light. *Used* in powder form for artificial illumination.

Magnesium Chloride—$MgCl_2 + 6H_2O$.

Colorless, deliquescent, bitter crystals. *Soluble* in water; partly soluble in alcohol. Keep in well stoppered bottle. *Used,* sometimes in the manufacture of gelatino-chloride crystals.

Magnesium Flashlamp—VI; IX.

A lamp specially constructed for the igniting of magnesium powder for artificial illumination. Extreme care must be taken not to place flashlight compounds in a lamp of this kind, as a dangerous explosion will result.

Magnesium Iodide—$MgI_2 + 8H_2O$.

Deliquescent, crystal powder. Decomposes in solution. Occasionally *used* in collodion.

Magnesium Light.

An artificial light produced by burning magnesium ribbon or powder. *Rich chemical rays.*

Magnesium Sulphate—$MgSO_4 + 7H_2O$.

Epsom Salts; or Bitter Salt.

Small, colorless, prismatic crystals; odorless; bitter, saline taste. *Soluble* in 1.5 parts cold water, 0.3 parts boiling water; insoluble in alcohol. Its principal photographic *use* is as a constituent of flashlight compounds.

Magnification.

Degree of enlargement. A term principally employed in telephotography and photo-micrography.

Manganese Sulphate—$MnSO_4 + 4H_2O$.

Transparent, pale, rose-red, efflorescent prisms; bitter, astringent taste. *Soluble* in boiling water; insoluble in alcohol. *Used* to increase sensitiveness of carbon tissue. Is also an ingredient in ozotype process.

Mask—IV; V.

Black or opaque paper having various shaped *cut-outs* or openings. *Used* to block out portions of a negative while printing; also, in mounting lantern-slides, the mask being placed between the slide and its cover-glass.

Masses—III; VII.

A section of a picture having one tone, and being sufficiently set apart from other portions as to attract a certain amount of attention.

Mastic.

(*See* **Gum Mastic.**)

Mat.

(*See* **Mask.**)

Matte Papers—IV.

Mealiness—IV; IX.

A mottled or spotted effect occurring sometimes in silver printing; generally due to the sensitizing bath being too weak.

Measure, English System of—II.

Measure, Metric System of—II.

Measuring Glass.

(*See* **Graduate.**)

Medium, Retouching—X.

Melting Point.

The degree of temperature at which solids become liquids.

Meniscus Lens.

(*See* **Lens, Meniscus.**)

Mercuric Chloride—$HgCl_2$—**II; IV.**

Perchloride of Mercury, Bichloride of Mercury, Corrosive Sublimate, Muriate of Quicksilver.

Heavy, colorless, prismatic crystals. *Soluble* in cold water, 1 to 16 parts; while in hot water, about 1 to 4. Soluble in alcohol and ether. In the presence of ammonium chloride it is more soluble, as this chemical converts it into a double chloride of mercury and ammonia. EXTREMELY POISONOUS. *Used* chiefly for intensification.

Mercurous Chloride—Hg_2Cl_2.

Chloride of Mercury.

Impalpable, yellowish-white, heavy powder. *Insoluble* in water, alcohol and ether. Mercurous chloride is one of the resulting compounds from mercurial intensification, and on the appli-

cation of ammonia the mercurous chloride is changed to black mercurous ammonium chloride. On the other hand, if sodium sulphite is employed as a blackening agent, the mercurous chloride is reduced to black metallic mercury.

Mercury—Hg.

Quicksilver.

Mobile, heavy, yellowish, lustrous liquid. *Soluble* in nitric acid, also hot sulphuric acid. Some mercuric salts are extremely poisonous, others very slightly. *Used* in the Daguerreotype process to develop the image.

Mercury Bichloride.

(*See* **Mercuric Chloride.**)

Mercury Perchloride.

(*See* **Mercuric Chloride.**)

Mercury Vapor Lamps.

A form of illumination of a peculiar character and highly actinic. Has no red rays in its composition, and for this reason is admirably adapted for artificial portrait work, etc. Obtained by the action of electricity on mercury contained in a vacuum tube.

Metabisulphite of Potash.

(*See* **Potassium Metabisulphite.**)

Meter.

A Metric measure of length, equal to 39.37 inches. The standard of this linear measure is one ten-millionth part of the distance between the equator and the north pole.

Meter, Exposure.

(*See* **Actinometer.**)

Methylated Alcohol.

(*See* **Alcohol.**)

Methylated Spirit.

(*See* **Alcohol.**)

Metol—$(C_6H_3\ [OH]\ CH_3\ NACH_3)_2\ H_2SO_4$.

Monomethylpara-amidometacresol Sulphate.

White powder. *Soluble* in water. *Use*: An energetic reducing or developing agent. Produces negatives of gray softness. An excellently balanced developer is one of a combination of metol and hydroquinon. (*See* **Hydroquinon.**) The combined developers work equally well for both plates and bromide or developing papers. Metol is poisonous to some people, causing very disagreeable and irritating sores on the hands.

Metol Poisoning, Antidote for—II.

Metol-Hydroquinon—II; IV; V.

Metol-Quinol.

A name given to the combined developer composed of *metol and hydroquinon.*

Metric System—II.

A system adopted by the French government in 1879. It is now, practically, universally used in all scientific work.
The METER is a unit of *length.*
The ARE is the unit of *surface,* being the square of the meter.
The LITRE is the unit of *capacity* and is the cube of a tenth part of the meter.
The GRAMME is the unit of *weight* and is equal to the weight of the cube of a hundredth part of a meter of distilled water.
Each unit has its decimal multiples and sub-multiples—*i. e.,* weights and measures ten times larger, or ten times smaller, than the principal units. The derivation of the prefixes denoting the multiples are from the Greek; those denoting sub-multiples are taken from the Latin.

Microphotography.

(*See* **Photo-micrography.**)

Microscope, Use of—IX.

Middle-Angle Lens.

(*See* **Angle, Normal.**)

Middle Distance.

(*See* **Distance, Middle.**)

Mirror, Reversing.

A plain mirror set at an angle of 45 degrees and placed close to the lens. The image is reversed by photographing it as it appears in the mirror. The mirror must be constructed so reflection comes from the top surface, in order to do away with a double image; therefore, an ordinary looking-glass will not answer the purpose.

Mirror, Silvering.

Silver Nitrate (Coarsely powdered) .....½ oz.
Liquid Ammonia .....¼ oz.
Water .....1¼ ozs.

Mix and allow to stand for 24 hours, then filter and add,

Naphtha .....30 ozs.

after which add,

Oil of Acacia .....25 drops.

After allowing to stand for another six hours the solution is ready for use. Clean the glass to be silvered and give it a highly polished surface; then place in a horizontal position and build a wall of putty or similar material around the edge, so it will be possible to have the solution on the glass at a depth of ⅛ to ¼ of an inch. Now, prepare a solution of

Oil of Cloves .....½ oz.
Spirits of Wine .....1½ ozs.

Drop from 6 to 12 drops of this mixture into the silver solution at different places. The more oil of cloves used the more rapid will be the deposit of the silver. The operation, however, should occupy a couple of hours.

The following formula, known as Martin's method for silvering glass, is one that may be employed when it is desired to re-silver mirrors or reflectors. Mix each solution separately:

(a) Nitrate of Silver .....175 grs.
Distilled Water .....10 ozs.

(b) Ammonium Nitrate .....262 ozs.
Distilled Water .....10 ozs.

(c) Caustic Potash (pure) .....437½ grs.
Distilled Water .....10 ozs.

(d) Sugar Candy (pure) .....219 grs.
Distilled Water .....5 ozs.

Dissolve and add,

Tartaric Acid .....50 grs.

Boil in a flask for ten minutes, and when cool add,

Alcohol .....1 oz.
Distilled Water to Make .....10 ozs.

When ready to use mix equal parts of a and b, also mix equal parts of c and d; then add the two solutions in the dish in which it is intended to silver the glass. Suspend the glass face downward.

Modeling—Retouching—X.

Molecular Weight.

A weight of the smallest particle that can exist. Molecular weight is ascertained by adding together the weights of all the atoms of the various elements, which have united to form the molecule of the chemical.

Molecule.

The smallest quantity of two or more atoms forming a chemical compound.

Monochrome.

A picture in one color.

Moonlight Photography—III.

Mottled.

An uneven appearance, usually apparent in the negative which has been developed in a solution that was not sufficiently agitated.

Mount and Mounting—I; IV; V; IX.

A cardboard or other support to which the photographic print is attached.

Mountant.

A viscous substance or adhesive used for mounting prints.

Mounting, Double—I, 602.

Double mounting is the placing of a print on a secondary mount, which latter is attached to the real mount or base. The secondary mount should be of a different shade, yet of the same color, as the base.

Mounting, Dry—IV, 1243-1253.

A process of mounting prints by means of a specially prepared tissue. A very convenient method of securely fastening prints on flexible mounts.

Mounting, Lens.

The brass or aluminum body to which the lens cells are attached.

Mounting, Multiple—IV, 1237-1241.

Multiple mounting calls for the use of more than two tints of paper or light cardboard on which to place the print. Each successive layer underneath the print is a trifle larger than the preceding one. The photographer's taste and skill are brought into play when using this method of mounting, as it is by the artistic combination of various tints and shades that the value of the picture will be enhanced, rather than detracted from.

Mounting Tissue, Dry—IV.

A specially prepared tissue used for dry mounting.

Mounts, Sizes of.

Petite Cards—1⅝ x 3⅛.

Carte-de-visite—2½ x 4⅛.
Cabinet—3⅞ x 5½.
Paris Panel—7½ x 13.

Mouth, Retouching—X.

Mucilage—IV, 1123-1125.

A term given to various forms of adhesives composed of gums, dextrine, etc.

Multiple Mounting.

(*See* **Mounting Multiple.**)

Multi-Speed Shutter—VI.

(*See* **Shutter, Multi-speed.**)

Muriate of Ammonia.

(*See* **Ammonium Chloride.**)

Muriate of Lime.

(*See* **Calcium Chloride.**)

Muriate of Platinum.

(*See* **Platinum Chloride - Platinic.**)

Muriatic Acid.

(*See* **Acid Hydrochloric.**)

N

Naphtha.

Benzin; Petroleum Ether.

Light, transparent, colorless, volatile liquid. *Soluble* in ether, oils and carbon disulphide. *Used* extensively in dissolving various resins, also in the manufacture of varnishes.

Naphtha, Coal.

(*See* **Benzene.**)

Naphtha, Mineral.

Mineral Naphtha is another name for petroleum oil or kerosene. *Use:* It is a solvent for India rubber, sulphur, phosphorous, camphor, iodine and a large majority of the resins, wax, fats, etc. It is also employed for illuminating purposes. Mixes with alcohol and oils, but not with water.

Naphtha, Wood.

A name given to impure methylic alcohol.

Naphthol, Green.

Green powder. *Soluble* in water, giving a yellowish-green color. *Used* in color photography.

Naphthol, Yellow.

Orange-yellow powder. *Soluble* in water. *Used* principally for making ray filters.

Narrow-Angle Lens—III, 289.

(*See* **Angle, Narrow.**)

Natural History Photography—III.

Negative—I; II; IV; VII; X.

The term applied to the metallic silver image on a glass plate or film in which the lights and darks of the original appear in reversed order. From the negative a positive may be printed, which again reverses the order of high-lights and shadows and gives a correct reproduction of the original.

Negative Collodion.

(*See* **Collodion.**)

Negative Enlarging—V.

Negative Lens.

(*See* **Lens, Negative.**)

Negative Paper.

(*See* **Paper, Negative.**)

Negative Varnish.

A varnish used for protecting the film side of the negative from scratches, etc. (*See* **Varnish, Negative.**)

Negatives Broken—X.

Negatives, Doctoring—II; IV.

Manipulating a negative either during development or before printing, so as to get better results on the print. When *doctored* just before printing the work is usually done on the back of the negative. Opaque and semi-opaque substances are employed to retard printing on certain parts, while ground-glass substitute is sometimes flowed on the glass side and this made transparent over sections that require deep printing, etc.

Negatives, Drying—I; II.

The drying of negatives can be hastened by first draining the plate after washing, then placing them in alcohol or formalin for a minute, or less, then setting the negatives in a draft, where they will dry quickly.

Negatives, Reversed.

Negatives in which the image is reversed with reference to right and left.

Negatives, Stripping.
(*See* **Acid Hydrofluoric.**)

Nepera—IV; V, 719, 721.
A trade name for papers manufactured by Eastman Kodak Co.

Newspaper Photography—IX.

Night Photography—III.

Nitrate of Ammonia.
(*See* **Ammonium Nitrate.**)

Nitrate of Cellulose.
(*See* **Pyroxylin.**)

Nitrate of Iron.
(*See* **Ferric Nitrate.**)

Nitrate of Silver.
(*See* **Silver Nitrate.**)

Nitrate of Uranium.
(*See* **Uranium Nitrate.**)

Nitre.
A name applied to *potassium nitrate,* also sometimes to *sodium nitrate.* The former, however, is usually designated as *saltpetre,* while the latter is more frequently termed *nitre.*

Nitric Acid.
(*See* **Acid Nitrate.**)

Nitro-Hydrochloric Acid.
(*See* **Aqua Regia.**)

Nodal Point—VI.
An optical term designating, respectively, the points of admission and emission on the axis of the lens where all instant or emitted rays converge to a point.

Node of Emission.
(*See* **Nodal Point.**)

Non-Abrasion Developer—IV.
A developer containing a very small percentage—5 grains to the ounce of solution—of iodide of potassium. This chemical acts in such a way as to keep the whites of the print clear and free from black lines or abrasion marks.

Non-Actinic.
A term applied to the rays of light which have practically no chemical action upon sensitive substances.

Non-Halation—II; III; VI; IX.
(*See* **Halation.**)

Normal Developer—I; II.
A developer that is properly balanced; *i. e.*, a developer that has not been modified in any way for under or over-exposure, but compounded for the treatment of a normally exposed plate.

Normal Exposure—II, 561-566.

Normal Perspective—VI.
(*See* **Perspective.**)

Nose, Retouching—X.

O

Object Finder.
A device used on the mechanical stage of a microscope to mark the position in the field of view.

Object Glass.
The lens in a telescope or microscope placed nearest to the object. In the higher-class instruments it is usually composed of two or more lenses cemented together, one of which is flint glass, the remainder being of crown glass.

Objective—IX.
The front lens or combination of lenses in the telescope, microscope, stereopticon or camera.

Oil.
Substances of viscous consistency having a more or less unctuous feel; are liquid at ordinary temperatures; are lighter than water, and are insoluble in it, but dissolve in alcohol, and more readily in ether; inflammable when heated in air, and burn with a luminous, smoky flame.

Oil of Lavender.
(*See* **Lavender, Oil of.**)

Oil of Vitriol.
(*See* **Acid Sulphuric.**)

Oiled Paper.
(*See* **Paper, Oiled.**)

Opacity.
The density of a negative, lantern-slide or positive.

Opal—IX.

A term applied to pictures made by various processes upon opal glass. The glass is coated with emulsion and worked similar to paper. The opal glass is obtainable for photographic purposes with either a plain polished surface or a finely ground surface. Owing to the softer effect given to the picture the latter is usually preferred.

Opaque—IV.

A substance that is impervious to rays of light.

Optical Center—VI.

A point on the axis of a lens where every incident ray of light which passes through it continues in a path parallel to its original course; *i. e.,* the direction of the ray is unaltered. The optical *center* is not necessarily the middle of the lens, or even inside it.

Optical Contact.

A print is said to be in optical contact with glass when it is firmly attached to it with no intervening air.

Optical Glass.

Usually crown or flint glass, specially manufactured for the construction of lenses.

Optical Lantern.

Stereopticon or Magic Lantern.

A form of apparatus used for projecting magnified images upon a white screen. Various forms of illumination may be employed.

Optics.

A term relating or pertaining to vision or sight; subservient to the faculty or function of seeing; *i. e.,* that which assists one to see more clearly.

Organic Chemistry.

(*See* **Chemistry, Organic.**)

Organic Substance.

Pertaining to substances which have organs. Therefore, pertaining to the animal and vegetable life and structure. *Ex.*: Sugar is an organic product or substance.

Orthochromatic—III; IX.

A photographic term denoting the correct rendering of colors; *i. e.,* free from the usual photographic fault of exaggerating the deepness of greens, yellows and reds, and the brightness of blues and violets.

Orthochromatic Plates.
(*See* **Plates, Orthochromatic.**)

Orthochromatize.
To make orthochromatic.

Orthostigmatic Lens.
(*See* **Lens, Orthostigmatic.**)

Ortol—C_6H_4 (OH) $NHCH_3HCl$—**II; IV.**
Methylorthoamidolphenol.
A yellowish-white crystalline substance soluble in water; resembles pyro in action, but more cleanly to use; closely allied to rodinol; may be used, instead of mercury, for intensification.

Ounce.
An English unit of weight.

Oval—IV.
Having the shape of, or resembling, the longitudinal section of an egg; *i. e.*, eliptical.

Over-Development.
(*See* **Developing, Over.**)

Over-Exposure.
(*See* **Exposure, Over.**)

Oxalate Developer.
A developer composed of potassium oxalate; used for developing platinum prints.

Oxalate of Ammonium.
(*See* **Ammonium Oxalate.**)

Oxalate of Iron.
(*See* **Ferrous Oxalate.**)

Oxalate of Potash.
(*See* **Potassium Oxalate.**)

Oxalates, Tests for.
Solutions containing oxalate will, with the addition of barium nitrate, give a white precipitate soluble in hydrochloric acid. The addition of silver nitrate to oxalate solutions will give a white precipitate soluble in nitric acid.

Oxalic Acid.
(*See* **Acid, Oxalic.**)

Ox-Gall.
Yellowish-green, thick extract; unpleasant odor; disagreeable, bitter taste. The bitter fluid secreted by the liver of the ox.

When clarified by boiling with animal charcoal and filtering it is used for water color paintings, etc. Also used to overcome the resistance of a greasy surface.

Oxygen—O.

A gaseous element; forms 8-9 by weight of water; is present and absolutely necessary in the air we breathe; is a component part of various chemicals; is necessary for the reduction of the photographic silver image, for the more rapidly the developer absorbs oxygen the greater will be the reducing action on the latent silver image, which image is changed to metallic silver.

Oxy-Hydrogen.

A mixture or combination of oxygen and hydrogen. *Used* as an illuminant in optical lanterns.

Ozobrome—V.

A simplification or modification of the carbon process permitting the making of carbon prints without the direct action of light. Also the making of carbon enlargements from bromide enlargements, thus doing away with the trouble and expense of making enlarged negatives.

Ozotype.

A modern process which is a modification of the carbon process; does away with the necessity of transferring the pigment and shows a visible image during printing.

P

Pad.

Usually a piece of felt or similar material used to place between the back of the printing-frame and the sensitive paper lying on the negative, to insure uniform contact between the printing paper and the film of the negative. Used in platinum printing to absorb dampness, as well as assist in keeping the paper in perfect contact with the negative.

Panchromatic Plates.

(*See* **Plates, Panchromatic.**)

Panoramic Camera.

(*See* **Camera, Panoramic.**)

Paper.

The paper base upon which various emulsions are placed for printing processes must be specially prepared in order that

they may be as chemically pure as possible. WHATMAN'S drawing paper, also the STEINBACH and the RIVES papers are the ones generally used by photographers who sensitize their own paper. The smooth side of the paper should always be used. There are various surfaces, however, as well as thicknesses of papers, the coarser or rougher surface papers being used where special artistic effect is desired.

Paper, Albuminized—V.

A silver printing-out paper. So called because of the characteristic surface produced by the coating of albumen.

Paper, Blotting.

A thick, porous, unsized paper. Quickly absorbs any superfluous solutions from anything laid against it. Chemically pure paper *only* should be employed for drying prints. Cheap blotters contain "hypo" and other impurities, which are ruinous to photographs.

Paper, Collodio-Carbon—IV, 325-439.

Paper, Collodio-Chloride—IV.

A paper similar to the gelatino-chloride paper, but coated with collodion instead of gelatin.

Paper, Collodion—IV, 73-111.

Paper, Filter.

An unsized paper having a thick and woolly texture. *Used* for filtering solutions.

Paper, Litmus—IV, 56-60.

White blotting paper, stained blue by immersion in litmus solution and dried. *Used* as a test for acids. Acids change the blue color to red. Litmus is a vegetable coloring material. If the litmus paper turns red on exposure to air, it may be restored to the blue color by holding over the fumes of ammonia.

Paper, Matt.

A paper having a matt or dead surface. When sensitized it gives very artistic prints.

Paper, Negative.

Transparent paper coated with an emulsion in practically the same manner as glass is coated for dry plates.

Paper, Oiled.

Oiled paper may be prepared by brushing sheets of paper with boiled oil, and then suspending them until dry.

Paper, Parchment.

An imitation of parchment prepared from ordinary unsized paper by immersing it for a few seconds in a solution of two parts sulphuric acid and one part water, at a temperature of 60° Fahr., then washing it in cold water and removing any remaining traces of the acids by dipping it in a weak solution of ammonia. Paper so treated resembles parchment in appearance, is rough, translucent, glossy, and practically unaffected by water.

Paper, Rives.

A chemically pure grade of paper used as a base upon which to place sensitive emulsions; usually employed by those who desire to sensitize their own papers. Manufactured at Rives, France.

Paper, Salted.

A paper coated with a solution of some soluble chloride. Afterwards it is floated on a silver nitrate bath. As the image is not at all thick the texture of the paper will show in the final print. Albumenized paper containing a chloride is sometimes termed a salted paper.

Paper, Self-Toning—I; IV.

A paper which, after printing, requires only fixing. In the majority of papers a brown tone is the only one obtainable, although there are on the market some self-toning papers that give black tones.

Paper, Sensitized.—I; IV.

Paper which has been made sensitive to light by coating with a sensitive emulsion. When submitted to the action of light either a visible or invisible (latent) image is formed. The invisible image is made visible by the process of development, while the visible one is usually made permanent by the process of toning. Usually both images are made permanent by fixing in a bath of sodium hyposulphite. There are, however, various papers that are manipulated differently, some being made permanent by simply washing in water.

Paper Size.

A coating placed upon paper, or used in the manufacture of the paper. Photographic printing papers are usually *sized* with a compound of alum and resin dissolved in a solution of soda and combined with potato starch. This is mixed with the paper pulp.

Paper, Steinbach.

A chemically pure grade of paper used as a base upon which to place sensitive emulsions; usually employed by those who desire to sensitize their own papers. Manufactured at Malmedy, Germany.

Paper, Test.

Blue and red litmus papers are used for testing the acidity or alkalinity of solutions. When blue litmus paper turns red it is a sign that the solution is acid, while if red litmus paper turns blue it is a sign that the solution is alkaline. If the solution effects neither red or blue litmus paper, it is neutral.

Papier Mache.

A material composed chiefly of paper. Prepared by pulping any kind of paper into a mass of doughy consistence; *i. e.*, reducing paper to a soft uniform mass by tearing it into minute particles and then soaking in water. The pulp is pressed into a mould to the shape required. For making trays the pulp is rolled into thin sheets and then pressed into a mould, after which the surface is oiled or varnished. Owing to its lightness and toughness trays of this kind are very useful in photography.

Paraffin.

A white, solid, colorless substance without taste or smell. Acted upon with great difficulty by other substances. *Used* in photography in connection with benzine for polishing ferrotype plates in order to give a special gloss and to keep prints from sticking to the plate when dry. After the ferrotype plate has been thoroughly cleansed with water and polished with cotton, a solution of benzine, 1 ounce, paraffine, 10 grains, is rubbed over the surface of the plate. After polishing the plate is rinsed in plain water and the prints placed in position.

Parchment Paper.

(*See* **Paper, Parchment.**)

Passe-Partout.

A picture-frame consisting usually of a pasteboard back and a piece of glass, between which a drawing, an engraving or a photograph is placed, the whole being held in position by means of strips of paper pasted over the edges.—(*Century Dictionary.*)

Paste—I; IV, 1222-1224.

Pastel Portarit.

Usually an enlarged photograph worked over with colored

chalk prepared by mixing fine pipe-clay, gum, water, and the required pigment.

Patent.

A grant by a government to the author of a new and useful invention for the exclusive right of exploiting that invention for a specified term of years. The law relating to United States patents, also all information with reference to the securing of a patent, may be secured by addressing the PATENT OFFICE, WASHINGTON, D. C.

Pencil of Light.

(*See* **Light, Pencil of.**)

Pencils—VIII.

In photography pencils are used chiefly in retouching negatives. The degrees of hardness are designated by the letters B and H, an H lead being far softer than an HHHHHH. The still softer grades are designated by the letter B, a BBBB lead being softer than a B lead.

Pendulum.

In photography a pendulum is used for counting time. The length of a pendulum whose vibration will mark off seconds of time varies according to the force of gravity in different localities. The complete to and fro beat of a 10-inch pendulum gives a full second of time. The length of the arc through which the pendulum vibrates in no way affects the result.

Perchloride of Gold.

(*See* **Gold Chloride.**)

Perchloride of Mercury.

(*See* **Mercuric Chloride.**)

Permanency.

A question which is of vital importance to every photographer. Permanency depends, *first,* upon the quality of the support for the image; *second,* upon the purity of the chemicals used in the sensitizing emulsion; *third,* upon the care which has been exercised in the various manipulations necessary to make the completed picture; *fourth,* upon the care that has been taken to thoroughly eliminate all chemicals not necessary for the finished print. The most permanent process is the one consisting of the most stable elements, and for this reason the carbon and platinum (platinotype) are the most permanent printing processes. If proper precautions are taken in the finishing of bromides, gaslight, as well as the various printing-out papers, their permanency is practically unquestionable.

Permanent Support.

(*See* **Support, Permanent.**)

Permanganate of Potash.

(*See* **Potassium Permanganate.**)

Pernitrate of Iron.

(*See* **Ferric Nitrate.**)

Perspective—III.

Atmosphere.

Solid objects, also objects located at various distances from the camera, having the effect of distance when produced on the flat surface of a photographic print. The main idea is to give such objects the same appearance in the photograph as that seen on viewing the objects themselves from the same point as that from which the photograph was taken.

Perspective, Aërial—III, 243, 244; **VI.**

Atmosphere.

A correct rendering of distance; *i. e.*, objects far away appear lighter and less definite in outline than those close at hand.

Perspective, False.

An exaggerated form of perspective. It is due to various causes; the principal one, however, is the use of an extremely wide-angle lens, which makes the objects in the view appear more remote from the camera than they actually exist. The space between near and distant objects is also exaggerated.

Perspective, Plane.

The surface on which the picture is thrown, or the transparent surface or plane through which the object represented may be supposed to be viewed.

Persulphate of Ammonia.

(*See* **Ammonium Persulphate.**)

Petzval Lens.

(*See* **Lens, Petzval.**)

Phosphoric Acid.

(*See* **Acid Phosphoric.**)

Photo-Engraving.

A process in which the photographic image is transferred to, and then etched on, metal. Zinc and copper are most usually employed.

Photogram.

A synonymous term with photograph.

Photogrammetry.

Surveying by means of photography.

Photograph.

(*a*) A picture produced by any process of photography.
(*b*) To produce a likeness by means of photography.

Photograph, Composite.

A single photographic portrait produced from more than one subject. The negatives from the individuals that are to enter into the composite photograph are so made as to show the faces as nearly as possible of the same size and lighting, and in the same position. These negatives are then printed so as to register together upon the same piece of paper, each being exposed to the light for the same fraction of the full time required for printing. Another method of making a composite photograph is to reproduce a number of different subjects on the same negative, carefully registering the eyes of all so that they will appear in identically the same spot on the negative. The exposure given each subject is the fractional part of the full time required for a properly exposed negative. It is believed that by study and comparison of such photographs made from a large series of subjects, types of countenance, local, general, etc., can be obtained.

Photographer.

One who makes pictures by means of photography.

Photographer, Amateur.

One who has a special love for photography and does not pursue it professionally or with a view to gain.

Photographer, Professional.

One who makes photography a business or a means of livelihood.

Photographic.

Pertaining to or produced by photography.

Photography—I.

The art of producing images of objects by an application of the chemical changes produced in certain substances, as silver chloride, bromide, or iodide, by the action of light, or more generally by radiant energy. The rays which are in general most active in this way are those of the upper part of the spectrum, as the blue-violet and ultra-violet rays. The red and yellow rays produce a much less marked effect on an ordinary sensitive plate; but it has been found possible to prepare a special gelatino-bromide plate, which is highly

sensitive even to the less refrangible rays, as those in the infra-red region of the spectrum. Photography rests on the fact that silver nitrate and various other chemicals are decomposed by certain solar rays and reduced, becoming dark or black, or in other ways affected according to the intensity and amount of actinic rays received on them. The process consists (*a*) in properly exposing a surface made sensitive to actinic rays to a projected image of the object to be reproduced; (*b*) in rendering visible if merely latent, or in coloring or toning, the reproduction of this image; (*c*) in removing the sensibility of those parts of the surface which have not been acted on, and in fixing permanently the image produced; and (*d*) if the image obtained is a negative, as in the majority of processes, in the mechanical production of positive copies from it.—(*Century Dictionary.*)

Photography, Flashlight—I; VI; VII.

A branch of photography whereby instantaneous pictures are made at night by the aid of flash powder in some form placed in a convenient receptacle.

Photography, Floral—III.

Photography, Pin-Hole—III.

The method of obtaining a photographic image by means of a small hole made by a needle in a metal plate instead of by means of a lens.

Photogravure.

A photographic process of reproduction giving prints which are intended to resemble fine copper-plate engravings.

Photo-Lithography.

A photo-engraving process by means of which a bichromated gelatin image is placed on a lithographic stone, the reproduction being taken from this in ink by impression, in the manner of an ordinary lithograph.

Photo-Micrography—IX.

A process of enlarging minute objects by means of the microscope and reproducing the large image by photography.

Photo-Salts.

(*See* **Salts, Haloid.**)

Photo-Sensitive.

A term applied to a substance which is sensitive to light.

Pianos, Photographing—IX.

Picric Acid.

(*See* Acid Picric.)

Pigment—V.

Coloring matter incorporated with sensitive material and forming the image in the carbon and similar processes.

Pinatype Three-Color Process—VIII.

Pin-Holes.

Minute, transparent spots or holes in the negative, usually caused by dust.

Plain Portrait Lighting—VI; VII.

Plain Salted Paper.

(*See* Paper, Salted.)

Plane Perspective.

(*See* Perspective, Plane.)

Plano-Concave Lens.

(*See* Lens, Concave, Plano.)

Plano-Convex Lens.

(*See* Lens, Convex, Plano.)

Plaster-of-Paris.

(*See* Calcium Sulphate.)

Plastigmat Lens.

(*See* Lens, Plastigmat.)

Plate—I; II; III; V.

A photographic term generally applied to the support for the sensitive emulsion in various processes, such as Daguerreotype-plate, collodion-plate, dry-plate, ferrotype-plate, etc.

Plate Adapter.

An attachment for film cameras enabling the use of plates.

Plate Box.

A light tight box or receptacle in which the sensitive photographic plate may be placed either before or after exposure.

Plate-Holder—I, 91–94.

(*See* Holder, Plate.)

Plate-Lifter.

A contrivance for raising the negative during development. Used to avoid staining the hands.

Plate-Rack.

A rack in which plates may be placed to dry. Generally termed negative drying rack.

Plate-Sunk Mount.

Mounts having a center portion pressed or sunken in.

Plate-Vise.

An arrangement for holding (*a*) a glass plate in position for polishing, or (*b*) a lantern-slide with cover-glass in position for binding.

Plates, Backing for—III; VI.

A coating of light absorbing or non-reflecting material, applied to the back of a plate to prevent halation. (*See* **Halation.**)

Plates, Cutting.

When desired to cut a dry-plate, lay it, film side down, on a perfectly clean sheet of lintless paper, and proceed to cut in the same manner as ordinary glass. Of course it is necessary to do this in the dark-room.

Plates, Dry—I; II.

Plates of glass coated with an emulsion composed of gelatin and sensitive silver salts. This emulsion is extremely sensitive to light, which makes it possible to place the *dry-plate* in the photographic camera and obtain an impression on the emulsion of objects situated in front of the camera by giving a very short exposure. (*See* **Exposure.**)

Plates, Lantern—II; VI.

A slow dry-plate measuring 3¼ x 4 inches. Generally a chloride of silver emulsion coated on a thin glass plate of excellent quality, and used for lantern-slides.

Plates, Orthochromatic—II; III; VI.

Plates which are color sensitive; also called isochromatic. (*See* **Orthochromatic.**)

Plates, Panchromatic—II, 726-732; **IX.**

A sensitive plate so prepared that it is sensitive, in almost a like degree, to all colors under certain conditions; *i. e.,* in combination with various color-screens or filters.

Plates, Seed—II.

Plates, Sizes of.

Lantern size (English)—3¼ x 3¼;
Lantern size (American)—3¼ x 4;
Quarter size plate—3¼ x 4¼;
Half plate—4¼ x 6½;
Stereo plate—4¼ x 6½;
Half plate (English)—4¾ x 6½;

Cabinet plate—4¼ x 6½;
Whole plate—6½ x 8½;
Other plates expressed by inches.

Plates, Transparency—II; V.

Plates, Trichromatic.

(*See* **Plates, Panchromatic.**)

Plates, Tropical—II, 692.

Platinotype Process—IV.

Platinum Process.

One of the most permanent of all printing processes, as metallic platinum is one of the most stable substances known. It is a semi-printing-out and semi-developing process, as the image prints out slightly in the iron salts, while the perfecting of the platinum image proper is effected by means of development. W. E. Woodbury briefly describes the principles of the process as follows: Paper is coated with a mixture of potassium chloroplatinite and ferric oxalate. The ferric oxalate is sensitive to light, becoming converted into ferrous oxalate; we therefore get a faint grayish orange-colored image of ferrous oxalate. Now, ferrous oxalate possesses the power when in solution of reducing potassium chloroplatinite to metallic platinum. It, therefore, only becomes necessary to dissolve the ferrous oxalate in a suitable liquid, when the potassium chloroplatinite will be reduced to the metallic state as metallic platinum. A solution of potassium oxalate possesses this requisite power of dissolving the ferrous oxalate. The paper prepared with the chloroplatinite of potash having an image on it of ferrous oxalate is, therefore, floated on this solution, and a picture consisting of finely divided metallic platinum is the result. It then only becomes necessary to dissolve away the remaining iron salts by any suitable acid. An extremely weak solution of muriatic acid is most generally employed for this purpose.

Platinum—Pt—IV.

White, malleable, ductile metal; softer than silver; grayish tinge. *Soluble* in aqua regia. *Used* extensively in photography in the platinum process. Platinum forms two chlorides as follows:

Platinum Chloride—Platinic—$PtCl_4$.

Platinum Tetrachloride, Platinum Perchloride, or Platinic Chloride.

Brownish-red crystals. *Soluble* in water, alcohol and ether. *Used* chiefly in platinum toning.

Platinum Chloride—Platinum—$PtCl_2$.

Platinum Bichloride.

Greyish-green to brown powder. *Soluble* in hot hydrochloric acid; insoluble in water. *Used* in making potassium chloroplatinite for the platinum process.

Platinum Toning.

Collodion matt papers, after having been toned in a gold bath, are sometimes toned in a bath of platinum, which tends to make the image of a still more permanent nature. The platinum toning bath must *first* be acid, and *second* should contain a minimum quantity of a salt, for if the silver which constitutes the image is submitted to the action of an excess of salt, it is transformed into chloride without any metallic deposit being formed to replace it. For both of these reasons it is essential that the prints be very carefully rinsed after the gold toning and previous to entering the platinum bath.

Platinum Prints, Varnish for.

Although there are many formulæ given for varnishing prints, there are very few that give the desired satisfactory results. The one which can be relied upon, however, is Adamantine varnish. A sufficient quantity of this varnish should be placed in a tray to permit of the whole print being dipped in it. All that is necessary is to immerse the print and then withdraw it, after which it should be hung up to dry.

Pneumatic Release—VI.

A rubber bulb and tube used for operating pneumatic shutters.

Pneumatic Shutter.

(*See* **Shutter, Pneumatic.**)

Poisons—II.

Some of the chemicals used in photography are poisonous either when taken internally or if absorbed through the skin or cuts. Complete table of poisons, with their effects and remedies, is given in the above reference.

P. O. P.

Printing-out Paper.

Porcelain, Cement for.

Fish glue	4 drms.
Water-glass	6 drms.
Precipitated chalk	1 drm.

Mix into a paste, then brush over the broken surfaces, pressing the latter into contact and drying in a warm place.

Porous.

A term used when a substance has minute perforations, generally invisible to the naked eye, and through which fluids may pass.

Portrait Lens.

(*See* **Lens, Portrait.**)

Portrait, Rembrandt.

(*See* **Rembrandt Portrait.**)

Portraiture—II; III; VI; VII.

The art of making likenesses of individuals.

Posing—VI; VII.

Positive.

Opposite to a negative. The image of an object in which the lights and shades are represented as seen in nature; a plate or print which shows the picture correctly, and not reversed.

Positive Lens.

(*See* **Lens, Positive.**)

Post Cards—I; IV.

Post Cards for Quick Delivery—IX.

Potash Alum.

(*See* **Alum.**)

Potash Caustic.

(*See* **Potassium Hydroxide.**)

Potash, Prussiate, Red—II, 260, 265, 285.

(*See* **Potassium Ferricyanide.**)

Potash, Prussiate, Yellow.

(*See* **Potassium Ferrocyanide.**)

Potassium—K.

A mineral. Fresh cut surface has silvery luster, rapidly passing to bluish or gray. *Caution.* Keep covered with benzene or other liquid free from oxygen. Salts of potassium in combination with carbonate are often used as an accelerator in various developing formulæ.

Potassium Bicarbonate—$KHCo_3$.

Colorless, transparent or translucent crystals, or white powder; slightly alkaline; saline taste. *Soluble in* about 3 parts water, almost insoluble in alcohol. Often sold as potassium carbonate, but is less soluble in water and less alkaline.

Potassium Bichromate—$K_2Cr_2O_7$—**V.**

Bichromate of Potash, Potassium Dichromate, Red Chromate of Potash.

Large, orange-red, translucent crystals; bitter, metallic taste. *Soluble* in 10 parts water. *Use.* When in contact with gelatin or other organic matter it is decomposed by light and renders the gelatin insoluble and incapable of absorbing water. For this reason it is the foundation of a number of photographic printing processes, such as the carbon process.

Potassium Bichromate Ray Filter—III.

Potassium Bromide—KBr—**I; II; IV.**

White, granular powder, or medium-size crystals; pungent, saline taste. *Soluble* in about 1.5 parts water, in 180 parts alcohol, in less than 1 part boiling water, in 16 parts boiling alcohol. *Used* largely in the manufacture of bromide emulsion; also as a restrainer in alkaline developer for both plates and paper. A 10% solution is usually employed for this latter purpose.

Potassium Caustic.

(*See* **Potassium Hydroxide.**)

Potassium Carbonate—K_2CO_3—**II; IV.**

Salts of Tartar.

White, deliquescent, granular powder; very *soluble* in water. *Used* as an accelerator in various developing formulæ.

Potassium Chlorate—$KClO_3$.

Colorless, lusterless, tabular crystals. *Soluble* in 16 parts of cold, and 12 parts of boiling, water, and in 13 parts of 85% alcohol; practically insoluble in absolute alcohol and in ether. Used in the platinum process for increasing the depth of contrast; also used in flashlight compounds.

Potassium Chloride—KCl.

Colorless, cubical crystals, or white, crystalline powder. *Soluble* in 3 parts of cold, but not soluble in boiling, water. Insoluble in alcohol or ether. *Use.* Added to the ferrous oxalate developer as a means of obtaining sepia tones with bromide paper prints.

Potassium Chloroplatinite—PtK_2Cl_4.

Platinum and Potassium Chloride (Platinous).

Ruby-red crystals. *Soluble* in water. *Used* in sensitizing platinum paper, also in acid toning bath.

Potassium Citrate—$K_3C_6H_5O_7 + H_2O$.

Colorless crystals, or white, deliquescent powder; cooling,

saline taste. Very *soluble* in water; slightly soluble in alcohol. *Used* occasionally in developing solutions.

Potassium Cyanide—KCN—**V.**

White, amorphous, deliquescent pieces. *Soluble* in 2 parts of water, and readily in boiling 65% alcohol. POISON. *Used* largely as a fixing agent in the collodion process. Unsuitable for gelatin plates, as it tends to dissolve gelatin.

Potassium Dichromate.

(*See* **Potassium Bichromate.**)

Potassium Ferric Oxalate—$Fe_2(C_2O_4)_3 + 3K_2C_2O_4 + 6H_2O$.

Emerald-green crystals. *Soluble* in water. *Used* in conjunction with sodium sulphite and hyposulphite as a reducer.

Potassium Ferricyanide—$K_3Fe(CN)_6$

Red Prussiate of Potash.

Large, red prisms or red powder. *Soluble* in water. *Used* with hypo for reducing density of gelatin negatives; also in the manufacture of ferro-prussiate paper.

Potassium Ferrocyanide—$K_4Fe(CN)_6 + 3H_2O$—**II.**

Yellow Prussiate of Potash.

Lemon-yellow, tabular crystals, or prisms; mild, saline taste; efflorescent on exposure to air. *Soluble* in 4 parts cold water and 2 parts boiling water. Insoluble in alcohol. Not poisonous alone, but acids will change it into a very violent POISON. *Used* in some of the blue-print processes; sometimes used in the developer to prevent fog. Assists in giving a clear, black image and a strong, brilliant negative.

Potassium Hydrate.

(*See* **Potassium Hydroxide.**)

Potassium Hydroxide—$KOH + H_2O$.

Potassium Hydrate; Caustic Potash.

White, deliquescent pieces showing a crystalline structure on fracture. *Soluble* in both water and alcohol. Absorbs carbon dioxide from air. Generally obtainable in cylindrical-shaped sticks. *Used* sometimes in alkaline development.

Potassium Iodide—KI.

Colorless, transparent, or translucent, cubical crystals, or white, granular powder; pungent, saline, bitter taste. Very *soluble* in water and in 40 parts of absolute alcohol. *Used* principally in the manufacture of some gelatin emulsions to form silver iodide.

Potassium Metabisulphite—$K_2S_2O_5$.

Potassium Pyrosulphite.

Large, colorless, transparent crystals. *Soluble* in cold water and has an odor of sulphuric acid, and a slight acid reaction. Not soluble in alcohol. *Used* in some developing formulæ as a preservative of the developing agent, and also to acidify the sodium hyposulphite fixing bath.

Potassium Nitrate—KNO_3.

Saltpetre.

Colorless, transparent, prismatic crystals, or crystalline powder. permanent in air. *Soluble* in 4 parts of cold, and in less than 0.5 parts of boiling, water. Almost insoluble in alcohol. In solution it is neutral to litmus paper. *Used* in the manufacture of nitric acid and pyroxylin (gun cotton).

Potassium Oxalate—$K_2C_2O_4 + H_2O$.

Neutral Oxalate of Potash.

Colorless, transparent crystals. *Soluble* in 3 parts water. *Used* in photography as a solvent for ferrous oxalate, therefore is the developing agent for platinum papers; also used as the developer for silver bromide and silver chloride plates and papers.

Potassium Percarbonate—$K_2C_2O_6 + H_2O$.

White crystals. *Soluble* in water with evolution of oxygen. *Used* principally for removing last traces of sodium hyposulphite from negatives and prints. (*See* **Hypo Eliminator.**)

Potassium Permanganate—$KMnO_4$.

Dark-purple, slender, opaque prisms; blue metallic reflection. Sweet, with astringent after-taste. *Soluble* in 16 parts cold water and in 3 parts boiling water. Insoluble in alcohol. *Used* for intensifying wet-plate collodion negatives, as a test for hypo, and as a hypo eliminator. Also as a negative reducer.

Potassium Salts, Tests for.

Platinic chloride added to solutions containing potassium salts gives a yellow, crystalline precipitate.

Potassium Sulphate—K_2SO_4.

White, hard crystals. *Soluble* in 10 parts cold, and 4 parts boiling, water. Insoluble in alcohol. *Used* in some developing formulæ in place of sodium sulphate.

Potassium Sulphide—K_2S.

Leather-brown or yellowish-green pieces. Deliquescent in moist air. *Soluble* in 2 parts of water, with but a slight resi-

due. Gives an alkaline yellowish-green solution. *Used* to precipitate black silver sulphide from old fixing baths.

Potassium Sulphocyanide—KSCN.

Potassium Sulphocyanate.

Colorless, prismatic crystals. Deliquescent in the air. Easily *soluble* in water and in alcohol. *Used* in various toning processes. Sometimes employed as a developer in the carbon process, owing to its power of dissolving gelatin. EXTREMELY POISONOUS.

Powder, Flashlight—VI.

Practice-Charts, Retouching—X.

Precipitate.

A precipitate is solid matter thrown down from a state of solution by the action of heat, light or chemical reagent.

Prescription.

Usually a written statement of the medicines or remedies to be used by the patient and the manner of using them.

Preservative.

A chemical used to preserve the keeping qualities of sensitized papers and plates, also solutions. *Ex.* Sodium sulphite or potassium metabisulphite are used in pyro developer to preserve the pyro, *i. e.*, to keep the developer from oxidizing too rapidly during the process of development, and to preserve the solution before use.

Press Photography—IX.

Principal Axis.

(*See* **Axis, Principal.**)

Principal Focus—VI.

(*See* **Focus, Principal.**)

Print.

A positive image obtained from a negative on paper, either directly or indirectly.

Print Trimmer.

A knife or instrument of any kind employed for trimming prints.

Printing—I; IV; V; IX.

The term applied to the method of obtaining positive pictures from the negative, on paper, or any other suitable material.

Printing, Contact—V, 884–890.

A printing term which signifies that the paper is placed in contact with the negative when making the exposure.

Printing, Depth of—I.

The extent to which printing must be carried in order that the resultant print may be of the proper strength.

Printing, Dodging in.

(*See* **Dodging in Printing.**)

Printing Frame.

A frame in which is placed the negative, and on top of this the sensitive surface of the printing paper, which latter is pressed into close contact with the negative, when it is ready for exposure to light.

Printing-In.

A term designating the addition of clouds, figures, etc., to a print from another negative, and which has spaces specially masked out for their insertion.

Printing-Out.

A term applied to any printing process in which the image becomes visible during the process of printing, being entirely produced by the action of light.

Printing-Out Paper, or P. O. P.

A name given to gelatino-chloride paper, due to the image printing out fully when submitted to the action of light.

Printing Room—IV.

Prints, Backing for—IV.

A paper coated with a collodion emulsion, lacking the sensitive salts, pasted on the back of prints to make them lay flat.

Prism.

A triangular-shaped piece of glass quartz or similar material. A ray of light falling upon one of the sides of a prism is refracted or bent from its original direction at an angle depending upon its own wave-length, the angle of the prism and the material of which the prism is made. *Used* for the dispersion of light; also in front of a lens in order to reverse a picture as regards right and left.

Prismatic Colors.

The colors into which ordinary white light is decomposed by a prism. The order of the colors are, red, orange, yellow, green, blue, indigo and violet. These colors are termed

primary or simple colors. If all the colors of the spectrum are recombined white light reappears.

Process Blocks.

Half-tone blocks or cuts.

A zinc or copper plate on which has been transferred a photographic image. *Used* for rapid reproduction by being inked in a regular printing press and copies printed on paper.

Profile Lightings—VI; VII.

Projection Lenses—VI.

Proofs—VIII; X.

Protar, Lens.

(*See* **Lens, Protar.**)

Proto-Sulphate of Iron.

(*See* **Ferrous Sulphate.**)

Prussiate of Potash.

(*See* **Potassium Ferricyanide [red], also Potassium Ferrocyanide [yellow]).**

Pseudoscope.

A kind of stereoscope that makes concave parts appear convex, and convex parts appear concave.

Pseudoscopic—IX.

The optical phenomena which gives false impressions of visual objects; *i. e.,* distant objects appear near, and vice versa.

Pumice Stone—X.

A form of powder used for polishing metals, cleaning glass, etc., for removing stains from fingers; also for producing a rough surface on negatives for retouching.

Pyro—I; II.

(*See* **Acid Pyrogallic.**)

Pyro-Acetone Developer—II.

Pyro-Ammonia Developer—II.

Pyrocatechin—$C_6H_6O_2$—II, 783.

Colorless crystals. *Soluble* in water, alcohol, ether, benzine and chloroform. *Use.* A powerful antiseptic; is a reducing agent and therefore used in various developing formulæ.

Pyrogallic Acid.

(*See* **Acid Pyrogallic.**)

Pyrogallol.

(*See* **Acid Pyrogallic.**)

Pyro-Metol—II.

Pyro-Stains, Removal of.

May be removed from fingers by washing in a 10% solution of oxalic acid, or a 5% solution of sulphuric acid, or a mixture of bleaching lime and citric acid.

Pyroxylin—II.

Nitrocellulose, Gun Cotton, Negative Cotton.

White, flossy substance; possesses physical appearance of ordinary cotton. *Soluble* in 25 parts of mixture of 1 volume alcohol and 3 volumes ether. *Use.* When dissolved in equal parts of alcohol and ether it forms collodion, the vehicle used for holding sensitive salts in collodion plates and papers. It is extremely inflammable. Sometimes used to ignite magnesium powder.

Q

Qualitative Analysis.

The chemical examination of bodies with a view to ascertain of what substances they are composed.

Quantitative Analysis.

The chemical examination of bodies with a view to ascertain in what proportions certain substances are contained in other substances.

Quart.

One-fourth of a gallon.

Quarter-Plate.

An English size of plate, being 3¼ x 4¼ inches.

Quick Delivery of Post Cards—IX.

Quinol.

(*See* **Hydroquinon.**)

R

Rack and Pinion—I, 88; **III,** 15.

An adjustment on cameras to facilitate varying the distance between the lens and the ground-glass or sensitive plate. It usually consists of a toothed or geared wheel which is caused to rotate on a straight toothed track. *The Rack and Pinion* is also employed on various scientific instruments where accurate adjustment is required.

Rack, Drying.

(*a*) A wood or metal frame on which to set plates for drying. The most common are those which fold up when not in use. (*b*) A frame on which cloth is stretched. Used for drying prints.

Radiography.

(*See* **X-Ray Photography.**)

Rapidity

(*a*) When used with reference to a lens the term rapidity means the relation of the length of focus to the working aperture. The larger the aperture as compared to the focal length the more *rapid* is the lens. (*b*) When spoken of plates or papers *rapidity* means the sensitiveness of the plates or papers to actinic light. The degree is registered by a sensitometer. (*c*) Rapidity is also a term used when speaking of the speed of a shutter.

Rapid Lens.

(*See* **Lens, Rapid.**)

Rapid Rectilinear Lens.

(*See* **Lens, Rapid Rectilinear.**)

Rapid Symmetrical Lens.

(*See* **Lens, Rapid Symmetrical.**)

Ray.

A line of light proceeding from a point of radiation or reflection. A collection of parallel rays constitutes a BEAM; a collection of diverging or converging rays, a PENCIL. The component elements of light also have the term *ray* applied to them. *Ex.* The yellow rays of the spectrum.

Ray Filter.

(*See* **Color Filter.**)

Rays, Principal.

A term applied to those rays which pass perpendicularly from the observer's eye to the perspective picture.

Rays, Ultra-Red.

The rays at the extreme red end of the spectrum. They are practically invisible and give the greatest amount of heat. (*See* **Prismatic Colors.**)

Rays, Ultra-Violet.

The rays at the extreme violet end of the spectrum. They vibrate so rapidly that they are invisible. They possess the greatest chemical activities of any rays. (*See* **Prismatic Colors.**)

Rays, Visual.

A term applied to the line of light imagined to come from the object to the eye.

Reaction.

A chemical term applied to the result of bringing two or more elements or compounds together, one or more new bodies being formed.

Ready-Sensitized Paper.

A term applied to commercially sensitized printing-out papers.

Reagent.

A chemical term applied to a substance used to effect chemical change in another substance, in order to identify its component parts or ascertain its composition.

Ream.

480 sheets of paper made up into 20 quires of 24 sheets each. The paper may be of any dimension.

Reaumur Thermometer.

(*See* **Thermometer, Reaumur.**)

Record Outfit—IX.

Re-Crystallize.

To crystallize again.

Rectification.

The act of removing impurities and to raise the strength of a substance by repeated distillation.

Rectified Spirit.

Alcohol which is 95% pure.

Rectigraph Lens.

(*See* **Lens, Rectigraph.**)

Rectilinear Lens.

(*See* **Lens, Rectilinear.**)

Red Chromate of Potash.

(*See* **Potassium Bichromate.**)

Re-Development—IV; V.

A process of intensifying or altering the color of a silver image. The essential points of the process are, *first,* thorough washing of the print; *second,* bleaching the print; *third,* redeveloping.

Red Fog.

(*See* **Fog, Dichroic.**)

Red Light.

(*See* **Light, Red.**)

Red Prussiate of Potash.

(*See* **Potassium Ferricyanide.**)

Reducer—II; V.

(*a*) A solution used to reduce the density or contrast of a negative or print. (*b*) A term applied to the developer, owing to the fact that it chemically reduces the silver salts of the latent image to metallic silver.

Reducer, Farmer's—II; V.

A reducing solution originated by Farmer. Composed of solutions of potassium ferricyanide and sodium hyposulphite. (Formula given in text.)

Reducing—I, 310, 311; II; V.

The process of reducing the density of negatives and prints by means of a reducer.

Reducing Agent—I, 310, 311; II; V.

(*a*) A chemical which reduces a silver salt to metallic silver. (*b*) A chemical which reduces the density of a negative.

Reducing Paste—X.

Reduction—I, 310, 311; II; V.

(*a*) Opposite to enlarging. The process of producing transparencies, prints or negatives from negatives, positives or prints of large size. (*b*) The process of reducing the density of a negative or print by means of a reducing solution. (*c*) The process of bringing out the latent image in a negative or print—*development.*

Reflecting Camera.

(*See* **Camera, Reflex.**)

Reflecting Screen.

(*See* **Screen, Reflecting.**)

Reflex Camera.

(*See* **Camera, Reflex.**)

Refraction—VI.

The bending or changing of the direction of rays of light. Refraction takes place when the ray of light passes from one medium to another of different density or refractive power.

Refractive Index.

Index of Refraction.

The ratio between the sines of the angle of incidence and

refraction, or a ray of light passing from one medium (usually the air) to another. Thus, this ratio for a ray passing from air into water is about 4:3, or, more exactly, 1.336, which is, therefore, the index of refraction of water.—(*Century Dictionary.*)

Register.

(*a*) A sensitive plate is in perfect register when it occupies the same position as the ground-glass, when the image was sharply focused on it. (*b*) In printing from negatives we speak of the perfect *register* of the image on the print, then the partially printed image at all times coincides with the negative image. (*c*) The book used in the reception-room in the studio for keeping a record of sittings, etc.

Registering Copyrights—VIII.

Relief.

(*a*) The degree of atmosphere or distance expressed in a photograph. (*b*) The height or the projection of a figure or feature from the ground or plane on which it is formed. *Ex.* The metallic silver image on the negative while still wet is in slight relief; *i. e.*, the metallic image which forms a high-light is thicker than the gelatin in the transparent shadows.

Rembrandt Portrait—VI; VII.

A portrait in which the greater portion of the face is in shadow; usually about one-fourth of the face is in light, while three-fourths is in shadow.

Repeating Back.

(*See* Back, Repeating.)

Residences, Photographing— I; III; IX.

Residues.

Substances such as gold, silver and platinum which can be recovered from photographic wastes such as old toning baths, fixing baths, scraps of sensitized paper, etc. In small photographic studios it does not pay to collect residues, but in large studios the residues are valuable.

Resin.

Rosin.

The residue left after distilling turpentine. Transparent amber-colored, hard, brittle, pulverizable resin; impure grades are darker, even almost black. *Soluble* in alcohol, ether, benzene, oils and alkalies, as well as acetic acid. *Used* in retouching medium.

Restrainer—I; II.

A chemical which will check a developer or similar agent having too strong an energetic action. In the case of over-exposed negatives a 10% solution of potassium bromide is used in the developer. Water is one of the most valuable restraining agents.

Reticulation.

(*a*) A fine net work of small lines on a surface of gelatin film—plates and papers. *Caused* usually by too sudden a change in temperature of baths. (*b*) This defect is also noticeable on collodion films when dry. In this case it is due to the solvents employed in the manufacture of the collodion not having been sufficiently anhydrous, or it may be due to impure pyroxylin (gun cotton).

Retouching—VI, 151, 176; X.

The process of removing imperfections from negatives by means of a pencil. Also the improving of any defective parts which may be in either a portrait, landscape or commercial negative.

Retouching Desk—X.

A desk or easel having an opening through which light is admitted, and on which the photographic negative is placed for retouching. The angle of the desk portion on which the negative rests is usually from 30° to 45° from the perpendicular.

Retouching Glass—X.

A reading glass or magnifying glass employed to better examine the photographic negative while retouching.

Retouching Medium—X.

The varnish or preparation applied to the negative previous to retouching, in order to give a tooth to the surface of the emulsion, to make the lead adhere.

Reversal.

(*a*) The result of extreme over-exposure, which produces, on development, a positive image instead of a negative one. (*b*) The addition of thiocarbamides to the developer, such as hydroquinon or eikonogen, will restrain the action of the developer and result in a positive, instead of a negative, image being formed.

Reversed Negatives.

(*See* **Negatives, Reversed.**)

Reversing Back.

(*See* **Back, Reversible.**)

Revolving Back.
(*See* **Back, Revolving.**)

Revolving Background.
(*See* **Background, Revolving.**)

Rising and Falling Front.
(*See* **Front, Rising and Falling.**)

Rives Paper.
(*See* **Paper, Rives.**)

Rochelle Salts—$KNaC_4H_4O_6 + 4H_2O$.
Potassium and Sodium Tartrate.
Colorless, transparent crystals or white powder. *Soluble* in 1.4 parts water; less than 1 part boiling water; almost insoluble in alcohol. *Used* as a developer in the Kallitype process; also in the preparation of gelatino-chloride printing-out paper emulsions.

Rodinal—C_6H_7NO—**II,** 460; **IX.**
Para-amidophenol.
Crystalline powder. A one solution developer. *Soluble* in water and alcohol. Darkens on exposure to air. *Use.* Generally employed for developing rapid exposures. It is also an excellent developer for bromide papers; in fact, for all-around amateur use it is a very good form of developer to employ.

Roll Holder.
(*See* **Holder, Roll.**)

Roller Squeegee.
A wooden roller covered with rubber having a metal or wooden handle employed for mounting prints, etc. *See* **Squeegee.**)

Röntgen Rays.
(*See* **X-Ray Photography.**)

Rosin.
(*See* **Resin.**)

Rotten-Stone.
An extremely fine mineral powder used for polishing metals, etc.

Rotating Stop.
(*See* **Diaphragm.**)

R. R. Lens.
An abbreviation for rapid rectilinear lens.

Rubber Finger Tips.

Finger stalls or caps made of rubber, to wear on the fingers when handling poisonous chemicals.

Rubber Solution—II.

Ruby Glass.

(*See* **Glass, Ruby.**)

Ruby Light.

(*See* **Light, Ruby.**)

Ruling Pen, Use of—IX.

Ruby Varnish.

(*See* **Varnish, Ruby.**)

Rust Spots.

When iron is present in the wash water or in water used for compounding chemical solutions, rust spots will invariably occur when the iron comes in contact with the silver of the emulsion. Rust spots most generally occur on printing-out papers.

S

Safe Edge—V.

A term generally used in carbon printing. A thin strip of black or non-actinic paper pasted around the edge of the negative. The *safe edge* may also be made of any opaquing material. The object of placing the safe edge around the negative is to keep the edges of the sensitive paper from printing. This is necessary in the carbon process, as the edges of the carbon print must be perfectly soluble; otherwise the carbon pigment would wrinkle and not adhere to the transfer support.

Sal Ammoniac.

(*See* **Ammonium Chloride.**)

Salicylic Acid.

(*See* **Acid Salicylic.**)

Salt, Common.

(*See* **Sodium Chloride.**)

Salted Paper.

(*See* **Paper, Salted.**)

Saltpeter.

(*See* **Potassium Nitrate.**)

Salts.

Any acid in which one or more atoms of hydrogen have been replaced with metallic atoms or basic radicals; any base in which the hydrogen atoms have been more or less replaced by non-metallic atoms or acid radicals; also, the product of the direct union of a metallic oxide and an anhydrid. The nomenclature of salts has a reference to the acids from which they are derived. *Ex.* Sulphates, nitrates, carbonates, etc., imply salts of sulphuric, nitric and carbonic acids. The termination *-ate* implies the maximum in the acids and the *-ite* the minimum. (*Century Dictionary.*)

Salts, Haloid.

The term *haloid salts* is applied to four elementary chemicals, which form a group whose chemical properties are more closely connected by their similarity than those of any other group of elements. These four haloid salts, or as they are usually termed halogens, resemble sea-salt in their composition, and are CHLORINE, BROMINE, IODINE AND FLUORINE.

Salts of Tartar.

(*See* **Potassium Carbonate.**)

Sandarac.

Gum Sandarac.

Brittle, elongated, light-yellow tears; translucent with vitreous fractures; crumbles to powder when masticated; inflammable. *Soluble* in alcohol, ether, acetone and in hot caustic alkalies; partly soluble in chloroform, volatile oils, oil of turpentine. *Used* in making varnishes.

Sarony Lighting—VII.

Satin, Printing on.

(*See* **Silk, Printing on.**)

Saturated Solution.

(*See* **Solution, Saturated.**)

Saxe Paper.

(*See* **Paper, Saxe.**)

Schlippe's Salt.

(*See* **Sodium Sulphantimonate.**)

Schriever Lighting—VII.

Scratches.

Scratches on negative films often occur, and many times they may be retouched by using either a soft pencil or India ink on

a brush. In order to avoid the negative being scratched it should be coated with a proper negative varnish. (*See* **Varnish.**)

Screen, Diffusing—VI; VII.

A screen made of cheesecloth or thin muslin placed between the source of illumination and the subject, to soften or assist in controlling the light which falls upon the subject.

Screen, Focusing.

(*See* **Focusing Screen.**)

Screen, Ray.

(*See* **Color Filter.**)

Screen, Reflecting—VI; VII.

A screen usually consisting of a frame on which is stretched white cloth. *Used* in portraiture to reflect light into, and illuminate, the shadows.

Sealing Wax.

When chemicals are to be kept in bottles for any period of time, the bottles should be filled full with the solution and the cork or rubber stopper inserted, and then sealed with *sealing wax*. The *sealing wax* which may be obtained from any stationery store will answer the purpose. RED SEALING WAX can be made by melting four ounces of bleached shellac with one ounce of Venice turpentine and three ounces of Chinese vermillion. GOLDEN SEALING WAX is made by using powdered yellow mica instead of vermillion. When BLACK WAX is desired ivory black may be substituted in place of the vermillion.

Seascape Photography—III.

Sector Shutter.

(*See* **Shutter, Sector.**)

Seed Growth, Recording—IX.

Seed Plates—II.

Self-Toning Paper.

(*See* **Paper, Self-Toning.**)

Semi-Opaque,

Half opaque and half transparent.

Semi-Transparent.

Partly transparent.

Sensitize—V.

The process or the act of making a substance sensitive or capable of being easily affected by actinic light.

Sensitized Paper.

(*See* **Paper, Sensitized.**)

Sensitizer—V.

A substance added or applied to the emulsion to increase or alter its sensitiveness to light.

Sensitizing—V.

Making sensitive to light, or the operation of coating with or immersing in a sensitizing bath, solution, or emulsion.

Sensitive.

Capable of being altered by the action of light.

Sensitiveness.

A term used in connection with plates and papers designating the amount of time required for a certain strength of light to impress itself on the emulsion, either visibly or invisibly.

Sensitometer.

An instrument for testing and comparing the sensitiveness of various photographic emulsions on plates and papers.

Sepia—I; IV; V.

A color or tone of print. Some of the various black and white printing processes will give a sepia or brownish-colored image, if the print is developed or toned with a suitable solution. There are some printing processes which will give a sepia or brownish-colored image by means of a single solution; other printing processes require simply washing the print in water in order to get the sepia tone.

Sepia Paper—I; IV.

A paper which will give a sepia-colored image.

Sheath.

A metallic frame or carrier used in magazine cameras for holding dry plates in position.

Shellac.

Gum Lac.

Reddish-brown, brittle, inflammable substance; thin sheets. Bleached shellac is white opaque, brittle masses. *Soluble* in alcohol and in water containing borax, sodium carbonate, caustic soda or ammonia. *Used* principally in varnishes.

Shutter—I; III; VI.

An instrument or attachment to regulate the amount of exposure to be given the sensitive plate in the camera. Shutters are of various forms, some fitting in front of the lens, some between the lens, some immediately back of the lens, while

others are operated just in front of the sensitive plate. A complete description of the various forms of shutters is given in the text.

Shutter, Automatic—I, 56, Page 53.

A form of shutter working between the cells of a doublet lens or in front of a single lens, setting itself automatically after each exposure.

Shutter, Behind-the-Lens—VI.

A behind-the-lens shutter is practically any form of shutter placed back of the lens.

Shutter, Between-the-Lens—VI.

A *between-the-lens* shutter is practically any form of shutter fitted between the two combinations of a doublet lens or lens cells of any other form of lens.

Shutter, Cloud.

A specially constructed shutter giving much less exposure to the clouds than the foreground.

Shutter, Diaphragm.

A shutter working between the cells of a double lens, and also acting as a diaphragm for the lens.

Shutter, Drop—VI.

A form of shutter for making quick exposures, its principle being; a slide, containing an aperture which admits light to the lens, is set in a frame and allowed to drop in front of the lens.

Shutter, Focal Plane—VI.

A shutter working at a very slight distance in front of the plate. Theoretically, it should work in identically the same plane as the sensitive plate.

Shutter, Instantaneous.

A shutter so regulated as to allow of extremely short exposures being made.

Shutter, Multi-speed—VI.

A *between-the-lens* shutter of such mechanical construction that exposures as rapid as 1-2000 of a second can be made. Complete description is given in the above reference.

Shutter, Pneumatic.

A shutter operated by air pressure, a bulb and tube being used for the purpose of operating it. Pressure on the bulb drives the air through the tube, forcing a small piston rod to release or operate the shutter.

Shutter, Roller Blind.

An instantaneous or time shutter made of a strip of opaque cloth in which is an aperture that permits of the lens being uncovered and again covered, thus permitting of the exposure being made. One form of this shutter which is placed close to the sensitive plate is termed a focal-plane shutter; another form, working on the same principle, can be placed either in front of or behind the lens.

Shutter, Sector—VI.

A very efficient type of shutter, working between-the-lens cells, giving practically accurate speeds up to 1-150 of a second. Manufactured by Goerz.

Shutter, Volute—VI.

A very efficient type of shutter, working between-the-lens cells, giving practically accurate speeds up to 1-150 of a second. Manufactured by Bausch & Lomb Optical Company.

Side Swing.

(*See* **Back Swing.**)

Silhouettes.

A *silhouette* portrait is a profile view of the face, the whole image being black and contrasting against a white background. There are various ways of producing silhouette portraits. The easiest one, perhaps, is to place the sitter near a brightly illuminated translucent screen (securing a profile view). The plate should be slightly under-exposed. When the negative is developed the head will be represented by clear glass, while the background will contain a dense deposit of silver. A print from such a negative will give a silhouette portrait.

Silk, Printing on—I, 366–374; **V,** 53.

Silk, satin and other fabrics may be printed upon with very effective results. The silk best suited for the purpose is that known as Chinese silk. Before sensitizing any fabric it should be first washed in warm water containing a good lather of soap, then rinsed in hot water, and gradually cooled down until the final washing water is quite cold. The cloth is sensitized in identically the same manner as paper, full instructions for which is given in the text.

Silver—Ag.

A metal of a white lusterless color. *Soluble* in nitric and in hot concentrated sulphuric acids; insoluble in hydrochloric and in cold diluted sulphuric acid. *Used* principally in photography in the manufacture of silver nitrate, which latter is used in sensitive emulsions.

Silver Bath—II.

A term usually applied to the sensitizing solution used in the wet-plate process, also to the sensitizing bath for papers.

Silver Bromide—AgBr.

Bromide of Silver.

Yellowish powder. *Soluble* in concentrated ammonia; in solution of potassium cyanide and potassium bromide; also in solution of sodium hyposulphite. Insoluble in water, alcohol and ether. Its *uses* in the various sensitive emulsions, both for plates and papers, are very important. Bromide of silver is sensitive to light, although no visible change takes place when so exposed for a short period of time. The change which has taken place may be tested by adding to a solution of the salt any alkaline developing agent which will immediately turn the solution black.

Silver Chloride—AgCl.

White powder; blackens on exposure to light. *Soluble* in solutions of ammonium, potassium hyposulphite and in potassium cyanide. *Used* largely in the sensitizing emulsions of the various printing-out processes, owing to its properties of darkening on exposure to light.

Silver Emulsion.

An emulsion containing silver salts, usually silver bromide, iodide or chloride; these salts being held in suspension in such substances as collodion, gelatin, etc.

Silver Intensification.

(*See* **Intensification, Silver.**)

Silver Iodide—AgI.

Light yellow powder; odorless; tasteless; affected by light. *Soluble* in potassium iodide or potassium cyanide; also in ammonium hyposulphite. Insoluble in water and alcohol. *Used* in various sensitive emulsions and is extremely sensitive to light and gives a dense image.

Silver Nitrate—$AgNO_3$—II; VII.

Nitrate of Silver, Argentic Nitrate, Lunar Caustic.

Colorless, rhombic plates; odorless; bitter, caustic, metallic taste; rapidly reduced by organic matter in light. *Soluble* in about 1 part water, 26 parts alcohol, 0.1 part boiling water and 5 parts boiling alcohol. May be prepared by dissolving pure silver in nitric acid. Six ounces of silver are dissolved in 2½ ounces of strong nitric acid and 10 ounces of water, the solution being generally heated, after which it is evaporated

to dryness and heated to 198° Cent., to expel any excess of acid. *Used* extensively in photography, but especially to form other silver salts.

Silver Print.

A *print* made on paper which has been sensitized with an emulsion containing silver salts.

Silver Stains.

(*See* **Stains.**)

Silver Sub-Bromide.

A term used to designate the substance formed by the action of light upon silver bromide.

Silver Sub-Chloride.

A term used to designate the substance formed by the action of light upon silver chloride.

Silver Sub-Iodide.

A term used to designate the substance formed by the action of light upon silver iodide.

Silver Sub-Salts.

A term used to designate the substance formed by the action of light on the various salts of silver, such as silver bromide, chloride and iodide, the sub-salts being termed silver *sub-bromide, sub-chloride and sub-iodide.* These sub-salts are simply hypothetical substances, as it has never been possible to analyze them sufficiently to establish their chemical individuality.

Silver Sulphide—Ag_2S.

Grayish-black, heavy powder. The resultant salt of the decomposition of silver hyposulphite in prints. *Soluble* in nitric acid, which latter converts it into silver sulphite and silver nitrate; insoluble in water or ammonia.

Silver Salts, Tests for.

Soluble silver salts will give a white precipitate which is soluble in ammonia when placed in hydrochloric acid, while a brick-red precipitate will result when placed in potassium chromate; sulphuretted hydrogen gives a black precipitate.

Silvering Mirrors.

(*See* **Mirror, Silvering.**)

Silverware, Photographing—IX.

Single Lens.

(*See* **Lens, Single.**)

Single Transfer—V.

(*See* **Carbon Process.**)

Sink, Dark-Room—VIII.

Size—I, 539, 540.

A viscous solution made by boiling shreds of leather, parchment, etc., in water and then purifying it. Also from common glue, scraps of hides, horns, hoofs, etc. It is used in the manufacture of paper.

Sky—III; IV, 1147-1149.

A landscape scene which lacks sky values, or rather cloud effects, is not a perfect landscape. Owing to the fact that the sky is extremely actinic it is many times over-exposed before sufficient exposure has been given to the foreground or landscape proper. For this reason all detail in the clouds is lost. There are various methods employed for securing proper cloud effects in landscape scenes. Some shutters are so regulated that the sky portion will receive must less exposure than the foreground. Ray filters, which lessen the action of the blue rays of light, are also employed for this purpose, but judgment must be exercised in their use or an unnatural appearance will be given the picture, the cloud effect being too strong if too dark a filter is employed. The usual method is to make cloud negatives and print them in the picture after the foreground from another negative has been printed. All of these methods are given careful consideration in the text.

Skylight—VII.

A large light generally constructed specially for studio illumination. There are three general forms of skylights, known as double-slant, single-slant and perpendicular lights. Various photographers give preference to one style or another, according to their own individual ideas. The main idea is to have a light that will facilitate the photographer in perfectly lighting his model. A soft light is required; therefore, ground-glass or ribbed glass is to be preferred to plain glass. The skylight should be perfectly rain proof and have adjustable curtains which will enable the operator to secure the proper angle of light and the amount of illumination desired. Diffusing curtains are also of value in softening the light, although movable screens and diffusing devices are employed by many photographers for locally controlling the light effect on the model. When a studio room is of sufficient length the skylight should be located in the middle of the side wall, so as to permit of one working from either end of the skylight. In smaller

rooms the skylight should be in the side wall, at least five feet from one end of the room.

Sky Negatives.

Negatives on which exposures have been made of various cloud forms, to be used in combination printing with landscape negatives.

Skyshade.

A hood or similar arrangement placed on the lens to prevent too strong illumination from the sky to strike directly into the lens. Some forms of sky shades are constructed to allow of a shorter exposure being given to the sky than to the foreground.

Slide, Dark.

(*See* **Holder, Plate.**)

Slide, Lantern.

(*See* **Plates, Lantern.**)

Snap Shot.

An instantaneous exposure, owing to the shortness of which it is necessary to use a shutter of some description.

Snow Photography—I; III; V, 121.

The greatest difficulty in making snow scenes is the danger of flat results. Usually this is due to over-exposure. One must bear in mind that everything is very brilliantly illuminated, and when the ground is covered with snow there is very little opportunity of securing shadows which would tend to give contrast. For this reason the greatest of care must be exercised in exposure, as well as in development of the negative.

Soap, Castile.

Made from soda and olive oil. Only the pure white soap should be used for lubricating prints before burnishing. Castile soap is sometimes given a marble appearance by veining it with oxide of iron, which gives green or red lines, according to the age of the soap.

Soda—I.

(*See* **Sodium.**)

Common washing soda is an impure form of carbonate of soda.

Sodium—Na.

Light, soft, ductile, malleable metal. Silvery-white when freshly cut, but rapidly becomes dull on exposure to air, and becomes covered with crusts of sodium hydroxide and sodium

carbonate. *Use.* When in combination with carbonates, sulphates, etc., it fills an important place in the list of photographic chemicals.

Sodium Acetate—$NaC_2H_3O_2 + 3H_2O$.

Colorless, transparent crystals; efflorescent in warm air. *Soluble* in 1 part of water, in ⅔ part of cold, and in 1 part of boiling, alcohol. *Used* in gold toning baths.

Sodium Biborate.

(*See* **Sodium Borate.**)

Sodium Bicarbonate—$NaHCO_3$—**IV,** 187.

White, opaque powder, or crystalline lumps. Cooling, mildly alkaline taste. *Soluble* in 12 parts of water, but insoluble in alcohol. The solution is slightly alkaline to litmus paper. *Used* principally in toning baths.

Sodium Bichromate—$Na_2Cr_2O_7 + H_2O$.

Sodium Dichromate.

Red, deliquescent crystal fragments. *Soluble* in water. Often *used* in place of potassium bichromate, being much cheaper and more readily soluble than the potassium salts.

Sodium Borate—$Na_2B_4O_7 + 10H_2O$—**IV.**

Borax.

Hard, white crystals, or white powder; sweetish, alkaline taste. *Soluble* in 1 part glycerin, 0.5 parts boiling water; insoluble in alcohol. *Used* in various toning baths for printing-out papers in which it exercises an alkaline action.

Sodium Bromide—NaBr.

White, crystalline powder; saline, feeble, bitter taste, absorbs moisture from air without being deliquescent. *Soluble* in about 1.7 parts water; 12.5 parts alcohol; 0.8 parts boiling water; 11 parts boiling alcohol. *Used* largely in gelatin emulsions, causing them to become more sensitive to the orange and yellow rays of light than does potassium or ammonium bromide.

Sodium Carbonate Crystals — $Na_2CO_3 + 10H_2O$ — **II; IV; V.**

Colorless, transparent crystals. Efflorescent in air. Strongly alkaline taste. *Soluble* in 1.6 parts cold water, 0.2 parts boiling water. The crystals contain about ten parts of water to one part of the chemical. For this reason it is more advisable to make these solutions by means of hydrometer test than by weight. *Used* largely as the accelerator in developing solutions. Its strong alkaline action readily opens the pores of

the emulsion, thus permitting the developing agent to act more readily upon the latent silver image. For photographic use, only the purest form is recommended. Common washing soda is many times substituted for sodium carbonate, but uniform results cannot be relied upon when washing soda is employed.

Sodium Carbonate—Dried—Na_2CO_3.

White dry powder containing about 80% sodium carbonate. *Used* the same as sodium carbonate crystals.

Sodium Carbonate—Anhydrous—Na_2CO_3.

White powder; being from 99 to 100% pure sodium carbonate. This is the purest and best form of sodium carbonate in photographic use.

Sodium Caustic.

(*See* **Sodium Hydrate.**)

Sodium Chloride—NaCl.

Chloride of Sodium, Common Salt.

White, cubical crystals or crystalline powder. *Soluble* in 2.7 parts water, insoluble in alcohol. The solution is neutral to litmus paper. *Used* in some toning baths to assist in giving uniform tones to the prints. Also employed in the salting of albumen paper, etc.

Sodium Citrate—$NaC_6H_7O_7 + H_2O$.

White crystals or granular powder. Soluble in 1.1 parts water, slightly soluble in alcohol. *Used* as a restrainer.

Sodium Dichromate.

(*See* **Sodium Bichromate.**)

Sodium Hydrate—$NaOH + H_2O$—**II**, 420.

Caustic Soda, Sodium Hydroxide.

White, deliquescent flakes, plates or sticks; acrid caustic taste. *Soluble* in 1.8 parts boiling water. Keep in well-stoppered bottles. *Used* sometimes as an alkaline in developing solutions.

Sodium Hydroxide.

(*See* **Sodium Hydrate.**)

Sodium Hyposulphite—$Na_2S_2O_3 + 5H_2O$.—**II; IV; V.**

Hyposulphite of Soda, "Hypo," Sodium Thiosulphate.

White, transparent crystals. Cooling, with bitter after-taste. *Soluble* in 0.65 parts water; insoluble in alcohol. Permanent in air at ordinary temperatures, but liquefies at 122° Fahr. in its own water of crystallization. For this reason it should be kept in a cool place. *Use.* The principal use of sodium hyposulphite in photography is as a fixing agent, because it readily

dissolves the haloid silver salts. For PLATES a solution of 1 part sodium hyposulphite in 4 parts water is recommended, while for DEVELOPING PAPERS 1 part sodium hyposulphite in 16 parts water should be employed. An acid bath, however, is to be recommended for the fixing of developing papers, as such a bath hardens the film on the paper and tends to do away with yellow stains, which sometimes will occur in the case of a plain hypo bath if the developer is not rinsed off the print sufficiently before placing it in the fixing bath. For PRINTING-OUT PAPERS the hypo bath should test from 15° to 19° hydrometer. When prints are placed in the hypo bath for fixing they should be constantly moved, so as to insure thorough fixation. Then as thoroughly remove the unused silver salts. When a silver print is fixed in sodium hyposulphite two salts are formed. *Ex.* The silver print contains silver chloride, and the sodium hyposulphite dissolves this, forming silver sodium hyposulphite and sodium chloride, according to the following formula:

$$AgCl + Na_2S_2O_3 = AgNaS_2O_3 + NaCl$$

The double salt of silver hyposulphite and sodium is practically insoluble in water, but is soluble in sodium hyposulphite. For this reason it is important that the plates and papers remain in the fixing bath double the length of time required to visibly remove the unused silver salts. Upon this rests the permanency of the image. The plates should be thoroughly washed in many changes of water, or in running water, for at least one hour, in order to thoroughly remove all chemicals. *Hypo eliminators* have been recommended for the purpose of removing the excess of soluble salts, but washing in water is the best hypo eliminator. If sulphuric acid is added to a solution of sodium hyposulphite, sulphur will be liberated from the hypo. For this reason the fixing bath for papers should be alkaline; otherwise sulphur stains giving yellowish whites will result.

Sodium Hyposulphite, Test for Presence of.

Should one desire to test prints or plates to see if all hypo has been eliminated, the following solution is recommended:

Prepare a little starch paste by boiling starch in distilled water. Add to this a few drops of iodine solution. As iodine is not soluble in water, this solution must be made by dissolving the iodine in alcohol, or in a potassium iodide solution. Iodide of starch will be formed immediately upon the addition of the iodine solution to the starch paste, resulting in a deep blue color. The blue color will disappear when a

drop or two of this iodide of starch is added to the wash water when hypo is present.

Sodium Nitrate—$NaNO_3$.

Saltpetre, or Niter.

Colorless, transparent crystals; saline, slightly bitter taste. *Soluble* in 1.2 parts of water and in 50 parts of alcohol. *Use.* Sometimes added to the silver bath for albumen paper; also added to developers to assist in giving a chocolate color.

Sodium Oxalate—$Na_2C_2O_4$.

White, crystalline powder. *Soluble* in 31 parts of cold, and in 16 parts of boiling, water. *Used* as a developing agent in some platinum processes.

Sodium Phosphate—Na_2HPO_4.

Colorless, transparent crystals or white granular powder; cooling saline taste. Efflorescent in dry air. Crystals contain 12 parts water, while the powder is practically free from water. *Soluble* in six parts of water; insoluble in alcohol. *Used* in various toning baths.

Sodium Silicate—$Na_2SiO_3 + H_2O$.

Water Glass.

White to grayish white, hard, flat pieces. *Soluble* in water. Gives a strong alkaline liquid. *Used* in the Collotype and other printing processes.

Sodium Sulphantimonate—$Na_2SbS_4 + 9H_2O$.

Schlippe's Salt.

Large, colorless or yellow crystals; alkaline reaction. *Soluble* in water. *Use* in photography is chiefly in intensifying collodion.

Sodium Sulphate—$Na_2SO_4 + 10H_2O$.

Glauber's Salt.

Colorless, efflorescent crystals. *Soluble* in 3 parts of cold, and in 0.4 parts of boiling water; insoluble in alcohol. Solution is neutral to litmus paper. This salt is sometimes confused with sodium sulphite, but it should not be used in developers, as it will not give the proper action.

Sodium Sulphide—$Na_2S + 9H_2O$—**II; IV.**

Colorless to yellowish, deliquescent crystals. Easily and clearly *soluble* in water. Solution slightly alkaline to litmus paper. *Used* principally in developing solutions.

Sodium Sulphite—Crystals—$Na_2SO_3 + 7H_2O$—**I; II; IV.**

Colorless crystals; saline, sulphurous taste; efflorescent in air. Soluble in about 4 parts water. The crystals contain 7

parts water of crystallization. *Used* principally as a preservative for pyro. It is also employed in various other developing solutions. Employed as a darkening agent in mercuric intensification. It may be used in place of sodium hyposulphite as a fixing agent, but it is not as effective as the "hypo," at the same time being more expensive. Should it be necessary to use it as a fixing agent, however, 4 ounces of the chemical should be dissolved in 20 ounces of water. Sodium sulphite should be kept in well-stoppered bottles, for when exposed to air it decomposes, a white powder—sodium sulphate forming on the outside of the crystals.

Sodium Sulphite—Dried—Na_2SO_3.

A white powder containing from 85 to 90 percent of sodium sulphite. The best form of sodium sulphite to use, as it works better and its purity is more certain than the crystalline form.

Sodium Thiosulphate.

(*See* **Sodium Hyposulphite.**)

Sodium Tungstate—$Na_2WO_4 + 2H_2O$.

Colorless prisms or rhombic plates. *Soluble* in four parts of water. Solution is alkaline to litmus paper. *Used* principally in toning baths.

Soft Effects.

The opposite to contrast.

Harsh, contrasty results are seldom desired in the photographic print, and it is for this reason that the photographer usually aims towards securing *soft effects*. One should not go to the extreme, however, as flatness and a picture lacking life would result. It is necessary to have high-lights and shadows, but the intervening tones should all be well represented, for it is the half-tones that give contrast to the picture. The individuality of the photographer and his own likes and dislikes will have much to do with his individual idea of what is meant by soft effects.

Solar Camera.

(*See* **Camera, Solar.**)

Solarization.

(*See* **Reversal.**) Also a term applied to the bronzing of prints.

Solidification.

The changing of a liquid substance to the solid state.

Solution—I; II; V.

The changing of a substance from a solid or gaseous state

to the liquid state. In photography, however, the term *solution* is used when a substance is dissolved in water.

Solution, Clearing—I, 487; II; IV; V, 922–924.

A solution having a weak dissolving action upon metallic silver. Generally composed of citric acid and alum. *Used* for clearing negatives which become stained during development; also for papers.

Solutions, Concentrated.

A liquid in which is dissolved a large amount of a substance. The object of such a solution is usually to decrease the amount of solvents, having as much of the dissolved substance as possible.

Solution, India Rubber.

Made by dissolving the purest rubber in benzole, carbon disulphide, etc. Often used around the edges of plates, to prevent frilling; also as a substratum coating for collodion and albumen processes.

Solution, Saturated.

A solution is said to be *saturated* when it will hold no more of a solid. To obtain a saturated solution of any solid, it is advisable to dissolve the chemical in warm water until some of the solid remains at the bottom. Upon cooling some of the chemical which was in solution will be thrown down—*precipitated.* The solution will now be a saturated one. As a rule, warm water will dissolve and hold in suspension a greater quantity of a solid than cold water. Saturated solutions for use should have a temperature of 60° Fahr., or 15° Cent.

Solution, Stock.

A concentrated solution for either developing, toning, fixing, etc., baths. Stock solutions are to be diluted with water before use.

Solution, 10%.

A ten-per-cent solution is made by dissolving one part of a substance in ten parts water.

Spatula.

An instrument similar to a knife, having a thin blade with a round end, used for mixing chemicals in the form of a paste.

Specific Gravity.

The ratio of the weight of a given bulk of any substance to that of a standard substance. The substance taken as the standard is water for solids and liquids, air or hydrogen for gases. The weights of bodies being proportional to their

masses, it follows that the *specific gravity* of a body is equivalent to its relative density, and the term DENSITY has nearly displaced *specific gravity* in scientific works. As long as the term *specific gravity* was in use, water at 62° Fahr, was taken as the standard in England; when the term *density* is used, water at its maximum density—4° Cent. or 39.2° Fahr.—is the standard. A common method of obtaining the *specific gravity* of solids is to weigh the body in air, then in pure distilled water, and divide the weight in air by the loss of weight in water, the result being the specific gravity of the body. —(*Century Dictionary.*)

Specific Heat.

The number of heat units, or in other words, the amount of heat required to raise equal weights of different substances through one degree of temperature. Water is taken as the standard. The definition given by Clerk Maxwell is, the *specific heat* of a body is the ratio of the quantity of heat required to raise that body 1° to the quantity required to raise an equal weight of water 1°.

Spectroscope.

An instrument employed to separate the rays of light in order to find the spectrum.

Spectrum.

A band of light showing the component rays of white light. (*See* **Prismatic Colors.**)

Spherical Aberration.

(*See* **Aberration, Spherical.**)

Spenoxylic Acid.

(*See* **Acid Salicylic.**)

Spirit Sensitizer—V.

Spirits of Hartshorn.

(*See* **Ammonia.**)

Spirits of Salt.

(*See* **Acid Hydrochloric.**)

Spirits of Wine.

(*See* **Alcohol.**)

Spots, Rust.

(*See* **Rust Spots.**)

Squeegee—I, 398, 399; **V.**

There are two forms of squeegees in photography, one being known as a *flat squeegee,* the other a *roller squeegee.* The

former is a strip of heavy rubber fastened to a flat wooden handle, while the latter is a wooden roller covered with rubber. The *flat squeegee* is used principally in the carbon process for expelling water. The *roller squeegee* is preferred for mounting prints, rolling them in contact with the mount.

Stains—II, Page 364.

There are many kinds of stains, due to many different causes, but usually they are due to carelessness on the part of the photographer. Various methods for removing stains are given in Volume II, as referred to above.

Stamp Photographs.

Small photographs, usually having an ornamental, perforated border, and gummed on the back resembling an ordinary stamp.

Stand Development.

(*See* **Tank Development.**)

Starch.

Usually made from corn, arrow-root, rice and wheat. *Used* principally in photography for making paste for mounting purposes; it is also a reagent for iodine, the iodine of starch test solution being used to ascertain whether or not hypo is present in a solution. (*See* **Sodium Hyposulphite, Test for Presence of.**)

Statuary, Photographing—IX.

Stereoscope.

An instrument for viewing stereoscopic views.

Stereoscopic Views—IX.

Two views made from slightly different view-points of one particular subject and mounted side by side on one mount. Generally made with two lenses in the one camera, with the lenses mounted 3¼ inches apart. When viewed through a stereoscope the appearance is that of the natural relief as seen when viewing the subject from the same view-point as that from which the view was made.

Stigmatic Lens.

(*See* **Lens, Stigmatic.**)

Still.

An apparatus for distilling water or other liquids.

Stock Solution.

(*See* **Solution, Stock.**)

Stopper.

Bottles containing acids and strong alkaline solutions should be fitted with glass stoppers in preference to rubber or cork. Glass stoppers can be made to fit in the neck of bottles by grinding them in with a little fine emery powder paste. Many times glass stoppers will stick tightly in the bottle. (*See* **Bottle Stoppers, To Loosen,** for methods of removing stoppers from bottles.)

Stopping Down—VI.

Decreasing the size of the aperture of a lens by inserting a smaller stop or using a smaller diaphragm.

Stops—I; VI.

(*See* **Diaphragm.**)

Street Photography—III.

Stripping Film—II.

Removing a gelatin or collodion film from its support. (*See* **Acid Hydrofluoric.**)

Studio—VI; VII.

Properly speaking, the room in which the photographer makes portraits, *erroneously called the operating-room.* The length of the studio must be in accordance with the length of the focus of the lens employed. When selecting lenses the focal length must be that which will give the best results in that particular room. (*See* **Skylight.**)

Sub-Bromide of Silver.

(*See* **Silver Sub-Bromide.**)

Sub-Chloride of Silver.

(*See* **Silver Sub-Chloride.**)

Sub-Iodide of Silver.

(*See* **Silver Sub-Iodide.**)

Sublimate, Corrosive.

(*See* **Mercuric Chloride.**)

Sublimation.

(*See* **Distillation.**)

Substitute, Ground-Glass—IV; X.

Substratum.

An underlying coat or layer. The *substratum coating* is usually a term applied to the first coating given plates and papers.

This coating is applied in order to make the emulsion adhere evenly to the surface of the glass or paper.

Sugar of Lead.
(*See* **Lead Acetate.**)

Sulphate of Baryta.
(*See* **Barium Sulphate.**)

Sulphate of Calcium.
(*See* **Calcium Sulphate.**)

Sulphide of Ammonium.
(*See* **Ammonium Sulphide.**)

Sulphide of Potash.
(*See* **Potassium Sulphide.**)

Sulphide Toning—V, 1004.

A method of producing sepia tones on bromide prints, lantern-slides, etc.

Sulphite of Sodium.
(*See* **Sodium Sulphite.**)

Sulphites, Tests for.

Nitrate of silver added to a solution containing sulphites will give a white precipitate. When ferric chloride is added to solutions containing sulphites a blood-red color will result.

Sulphocarbonic Acid.
(*See* **Carbon Disulphide.**)

Sulphocyanate of Ammonium.
(*See* **Ammonium Sulphocyanate.**)

Sulphocyanide of Ammonium.
(*See* **Amomnium Sulphocyanide.**)

Sulphuretted Hydrogen.

An inflammable gas. Has a very disagreeable smell. *Soluble* slightly in water; more soluble in ammonia, soda and potash. *Used* to precipitate silver sulphide from fixing baths containing alum.

Sulphuret of Ammonium.
(*See* **Ammonium Sulphide.**)

Sulphuret of Carbon.
(*See* **Carbon Disulphide.**)

Sulphuric Acid.
(*See* **Acid Sulphuric.**)

Sulphurous Acid.
(*See* **Acid Sulphurous.**)

Sulphur Toning.
A method of producing sepia or warm tones on bromide prints. Affected by prolonged immersion in a hypo alum bath.

Supersaturated.
Saturated to excess.

Supplementary Lens—I; V.
(*See* **Lens, Supplementary.**)

Support, Flexible or Temporary—V.
A sheet of waxed paper used in the carbon process and employed for a temporary support on which the carbon is placed for development. After development the print is transferred to a final support.

Support, Permanent—V.
The final support used in the double-transfer carbon process.

Support, Temporary.
(*See* **Temporary Support.**)

Swing-Back.
(*See* **Back, Swing.**)

Swing-Bed.
(*See* **Bed, Swing.**)

Swing, Double—I, 87 ; **III,** 14.
A camera is said to have a double swing when the back can be moved both in a horizontal and in a perpendicular position.

Swing, Front.
(*See* **Bed, Swing.**)

Symmetrical Lens.
(*See* **Lens, Symmetrical.**)

Symbols—II, Pages 348–355.

Syphon.
A curved tube, one end of which is longed than the other. *Used* for transferring liquids from a higher level to a lower one. After starting the solution will flow through the tube to the lower vessel. The syphon is useful for removing a liquid without disturbing the precipitate at the bottom of the dish. A rubber or glass tube may be used for this purpose.

T

Tank Development—I, 326; II; IV, 736.

A method for developing plates in an upright position. Essentially the process consists of a zinc tank having grooves in the sides, into which the exposed plates may be inserted. A light-tight cover is fitted over the top of the tank. A sufficient quantity of developer is placed in the tank to cover the plates. The average tank will hold from six to twelve plates, thus permitting of that number being developed at one time.

Tannic Acid.

(*See* **Acid Tannic.**)

Tannin.

(*See* **Acid Tannic.**)

Telemeter.

An instrument for ascertaining the distance at which any object is situated.

Telephotographic Lens.

(*See* **Lens, Telephoto.**)

Telephotography.

The photographing of distant objects by means of the telephotographic lens.

Temperature—I; II; IV; V.

The degree or intensity of the sensible heat of a body. The temperature of the work room, as well as of the various solutions, is of vital importance to every photographic worker. Low temperature tends to retard the formation or development of the latent image, while high temperature accelerates it.

Temporary Support—V.

The support used in the double-transfer carbon process, on which the image is developed. The pigment is afterwards transferred from the temporary support to the final support, which operation gives a reversed picture.

Ten-Per-Cent Solution.

(*See* **Solution, 10%.**)

Terchloride of Gold.

(*See* **Gold Chloride.**)

Tessar Lens.

(*See* **Lens, Tessar.**)

Test for Oxalates.

(*See* **Oxalates, Test for.**)

Test for Potassium Salts.
(*See* **Potassium Salts, Test for.**)

Test for Silver Salts.
(*See* **Silver Salts, Test for.**)

Test for Presence of Hypo.
(*See* **Sodium Hyposulphite, Test for Presence of.**)

Test for Sulphites.
(*See* **Sulphite, Test for.**)

Test Paper.
(*See* **Paper, Test.**)

Test Tube.
A thin glass tube having a rounded bottom. *Used* for making chemical tests.

Test, Water.
(*See* **Water Test.**)

Testing Lenses.
(*See* **Lens Tests.**)

Thermometer, Centigrade.
A thermometer used in Europe, but little in America. A space between freezing and boiling point is divided into one hundred parts, the former being marked at zero, while the latter point is one hundred degrees. To convert Centigrade to Fahrenheit (the latter being used in America) it is necessary to multiply by 9, divide by 5, and add 32.

Thermometer, Fahrenheit.
The standard measure of temperature in the United States. The freezing point is 32 degrees. The boiling point of water 212 degrees, which leaves 180 degrees between these two points. In the Centigrade thermometer (*See* **Thermometer, Centigrade**) this space is divided into 100 degrees. To reduce Fahrenheit degrees to Centigrade, subtract 32, multiply by 5, and divide by 9.

Thermometer, Reaumur.
A *thermometer* scale in which the freezing point is marked 0° and the boiling point 80°. To reduce Reaumur degrees to Fahrenheit, multiply by 9, divide by 4, and add 32. To reduce Reaumur degrees to Centigrade, multiply by 5 and divide by 4.

Thiosulphate of Sodium.
(*See* **Sodium, Hyposulphite.**)

Three-Color Carbon Process—VIII.

Three-Color Gum Process—VIII.

Three-Color Photography—VI; VIII.
(*See* **Color Photography.**)

Tilting Tripod Head.
(*See* **Tripod Head, Tilting.**)

Time Development.
(*See* **Factorial Development.**)

Time Exposure.
An exposure which is not instantaneous.

Tintypes—II.

Tissue, Dry Mounting.
(*See* **Mounting Tissue, Dry.**)

Titling Negatives—X.

Tolidol—II, 778.

Tonal Values.
The different degrees of light and shade in a picture. When the various colors in the subject have been truthfully rendered in monochrome in the photograph, and the effect of distance and atmosphere is natural, the photograph is said to have correct tonal values.

Tone—I; IV.
The surface color of a finished print.

Toning Bath—I; IV.
A solution employed to change the color of a print by depositing a thin coating of gold or platinum over the image. There are various kinds of toning baths for different kinds of paper.

Toning Bath, Combined—I.
A bath for toning prints, in which the toning and fixing solutions are combined.

Transfer Paper.
(*See* **Temporary Support.**)

Translucent.
A substance is *translucent* when it allows the rays of light to pass through it, yet the substance is sufficiently opaque so that objects are not visible through it.

Transparency—V.
(*a*) Spoken of a substance through which rays of light can pass, and through which objects are visible. (*b*) A positive picture on glass. A lantern-slide is a transparency.

Transparency Plates—II; V.

Trays—II; IV; V.

Trichloride of Gold.
(*See* **Gold, Chloride.**)

Trichromatic Photography.
(*See* **Color Photography.**)

Trichromatic Plates.
(*See* **Plates, Panchromatic.**)

Trifocal Lens.
(*See* **Lens, Triple Convertible.**)

Trihydroxybenzine.
(*See* **Acid Pyrogallic.**)

Trimmer—IV, 1212, 1213.
An instrument used for cutting or trimming prints.

Trimming—I; IV.

Triplet Lens.
(*See* **Lens, Triple Convertible.**)

Tripod—I, 89, 90; III.
A standard or support having three legs. The legs are usually made in sections, so that the tripod can be folded into small space for carrying. A tripod is used especially for outdoor work.

Tripod Head, Tilting—III, 572; IX.
A piece of apparatus consisting of two boards hinged together. One of the boards is fastened to the tripod head, while the other is attached to the camera. By means of side braces it is possible to tilt the camera at any angle and hold it in such position for making exposure.

Tripoli.
A siliceous substance used in polishing metals, glass, etc. It consists of decomposed, impure limestone, practically the same as rotten-stone.

Tropical Plates—II, 692.

Troy Weight.
(*See* **Weight, Troy.**)

Tungstate of Soda.
(*See* **Sodium Tungstate.**)

Turpentine—IX.

Yellowish, greenish or bluish-green translucent viscid liquid; aromatic odor. Hot, pungent, somewhat bitter taste. Becomes hard and brittle on long exposure to air. *Soluble* in pure alcohol. Distilled turpentine is termed spirits of turpentine. *Used* as a solvent for varnishes.

Twigs, Photographing—IX.

Twin Lenses.

(*See* **Stereoscopic Views.**)

U

Ultra-Red Rays.

(*See* **Rays, Ultra-Red.**)

Ultra-Violet Rays.

(*See* **Rays, Ultra-Violet.**)

Unar Lens.

(*See* **Lens, Unar.**)

Under-Exposure.

(*See* **Exposure, Under.**)

Uniform System—VI.

A method of numbering diaphragm openings. F. 4 is taken as the standard, and termed No. 1. The numbers are termed the U. S. numbers.

Universal Developer—II.

Universal Focus.

(*See* **Lens, Fixed-Focus.**)

Universal Lens.

(*See* **Lens, Rectilinear.**)

Unsymmetrical Lens.

(*See* **Lens, Unsymmetrical.**)

Uranium—U.

A metal. Black granular mass. When united with nitrate is used for toning and as an intensifier.

Uranium Nitrate—$UO_2(NO_3)_2 + 6H_2O$—**IV,** 628-632.

Lemon-yellow, fluorescent, rhombic prisms. *Soluble* in water, alcohol and ether. *Used* in the uranium printing process in toning; also as an intensifier.

Uranium Toning.

A method of obtaining warm tones on bromide and developing papers. The tones, however, are not permanent.

U. S.

(*See* **Uniform System.**)

V

Vanadium Chloride—$2VO_24HCl + 3H_2O$.

Dark-green, syrupy mass. *Soluble* in water and alcohol. *Used* for obtaining green tones on bromide prints.

Varnish—IX; X.

There are various kinds of varnishes used in photography, and the following formula will be found of value for the various purposes for which they are designated:

Aluminum, Black Varnish for.

First clean the aluminum with fine emery powder. Wash well and dip quickly in the following solution:

Sulphate of Iron	1 oz.
Arsenic, White	1 oz.
Hydrochloric Acid	12 ozs.

The metal should be quickly withdrawn from the mixture and allowed to drain. If not dark enough, repeat the operation. When the color is deep enough dry off the aluminum with fine saw-dust; then lacquer.

Blackboard, Paint for.

Emery Powder (Medium Grain)	10 drs.
Ultra Marine (Dry)	1 oz.
Ivory Black	2 ozs.
Shellac	4 ozs.
Wood Alcohol	40 ozs.

Dissolve the shellac in half of the alcohol and moisten the other ingredients with the balance. As soon as the shellac is dissolved, mix and shake all well until thoroughly mixed.

Black, Dead, for Wood—**VI.**

Shellac	4 drs.
Borax	2 drs.
Glycerine	2 drs.
Water	6½ ozs.

After dissolving add 5 drs. of aniline black.

Another good black varnish is

Benzole	18 ozs.
Shellac India Rubber	1 dr.
Asphaltum	6 ozs.
Lamp-Black	As required.

Black for Cameras.

This black is for either the inside or outside, as well as for wood or leather.

Solution of Aniline Black in Alcohol	1 dr.
Bismark Brown	17 grs.
Wood Alcohol	½ dr.
Aniline	1¾ ozs.

Mix the dyes with the alcohol, then add the aniline and heat in a water bath until completely dissolved. Apply with a brush or flannel. Dry near a fire, or by exposure to the sun.

Black for Wood or Leather.

Mix lamp-black and French polish in a mortar. The more black employed the deader or more mat will be the surface, while the less of the lamp-black the brighter or more glossy will be the black; but if too much lamp-black is used it will easily rub off.

Brass, to Blacken.

(*See* **Brass.**)

Celluloid Varnish.

Celluloid	14 grs.
Amyl Alcohol	1 oz.
Acetone	1 oz.

Use cold.

Dead Black for Brass.

A good dead black for brass work, interiors of lens mounts, etc., can be made by mixing 24 grs. of lamp-black on a plate with about 35 drops of gold size.

Films, Varnish for.

Benzole	4 ozs.
Gum Damar	100 grs.

The varnish should be filtered before use. It may be applied either by pouring on the film, brushing on with a camel's-hair

brush, or by immersing the film in the varnish and then hanging it up to dry.

Machinery, Paint for Dulling Bright Surfaces.
(*See* **Machinery, Photographing.**)

Negative Varnish—**Cold.**

Benzine	3½ ozs.
Acetone	3½ ozs.
Absolute Alcohol	1¾ ozs.
Gum Sandarac	6½ drs.

Slightly warm the solvents in a water bath, while dissolving the gum sandarac. Filter and then place in a bottle, which should be carefully stoppered. A similar form of cold varnish may be made by dissolving ½ ounce of gum sandarac in 3 ounces of chloroform. Shake until dissolved, then filter.

Negative Varnish—**Hot.**

Absolute Alcohol	15 ozs.
Castor Oil	½ dr.
Shellac	13 drs.
Gum Sandarac	3 drs.
Gum Mastic	20 grs.

Dissolve and filter. The negative should be slightly warmed and the varnish applied while hot.

Removing Varnish—**II,** 152.

Immerse the negative in alcohol for five minutes, rubbing with cotton. If any of the resin remains, add a little ammonia to the alcohol. If the above method of procedure does not completely remove the varnish, make up a solution of

Alcohol	5 ozs.
Water	5 ozs.
Caustic Potash	½ oz.

Place the negative in a dish and pour on the solution, gently rocking until the varnish is dissolved. When using either of the above methods the plate should be well washed after the operation.

Retouching Medium—**X.**

The mediums recommended in the regular retouching lessons have been found most suitable for all practical purposes, but

should it be desired to experiment with other varnishes, any of the following will be found to give good results:

(a) Alcohol .....5 ozs.
Gum Sandarac .....1 oz.
Castor Oil .....5 ozs.
Venice Turpentine .....2 drs.

(b) Turpentine .....1 oz.
Powdered Resin .....30 grs.

(c) Alcohol .....1 oz.
Benzine .....2 ozs.
Acetone .....2 ozs.
Gum Sandarac .....½ oz.

(d) Turpentine .....1¼ ozs.
Gum Damar .....75 grs.
Oil of Lavender .....25 drops.

Varnish, Ruby.

Dissolve 60 grains of finely powdered aurine in 20 ozs. of ordinary negative varnish, and apply to the glass in the usual way. Prepared *ruby varnish* is obtainable from any dealer in photographic supplies, and it is cheaper to purchase it already prepared rather than to attempt preparing the mixture oneself.

Varnish, Removing—II, 152.

To remove varnish rub with a wad of cotton saturated with spirits of turpentine or alcohol.

Vaseline.

The more or less purified residue from the distillation of petroleum. Light yellowish or semi-solid, having an ointment consistency. *Soluble* in ether, chloroform, benzine, and slightly soluble in alcohol; insoluble in water and glycerine. *Use:* Rubbed around a glass stopper will prevent it from sticking. Rubbed on top of a cork stopper will prevent the air from entering the bottle. Used for making paper transparent.

Vehicle.

A substance usually of a viscous nature. *Used* to hold sensitive silver salts in suspension. The common *vehicles* used in photography are albumen, collodion, gelatin, etc.

Velox.—IV.

A trade name applied to gaslight paper. Used by Eastman Kodak Co.

Ventilation—II, 11.

It is very important that the photographic finishing rooms be perfectly ventilated. Especially is this true of the dark-room. The proper method for accomplishing this will be found in the text.

View Finder.

An attachment to an ordinary camera, consisting of a minute lens which throws on a mirror the same image that will be reproduced on the sensitive plate, and this image in turn reflects the object to a ground-glass placed in a horizontal position. This enables the photographer to see exactly what will be reproduced.

View Finder, Direct Vision—VI.

A direct vision view finder consists essentially of a metal frame, either square or rectangular in shape, and a small sight. Both the frame and the sight are placed on top of the camera. The sight is placed directly above the center of the ground-glass and the frame far enough in front of the sight, so that when looking through the sight and the frame the latter will include the same amount of view as will be reproduced on the sensitive plate in the camera.

View Lens.

(*See* **Lens, Landscape.**)

View Photography—III.

View-Point—I, 672; **III,** 47, 271, 272.

Vignetting—IV; V; VII.

(*a*) A method of blending or cutting away portions of a picture by inserting a serrated edged cardboard in front of the lens. (*b*) A method of gradually blending away the margins of a print.

Visual Focus.

(*See* **Focus, Visual.**)

Visual Rays.

(*See* **Rays, Visual.**)

Vitriol.

A name that was at one time given to all sulphates, and designated "white," "blue," "green," vitriol, etc.

Vitriol, Oil of.

(*See* **Acid Sulphuric.**)

Voigtländer Lenses—VI.

Volute Shutter.

(*See* **Shutter, Volute.**)

Vulcanite.

A hard form of rubber which is not elastic. *Used* principally for making trays and other dishes for photographic use.

W

Wash Drawings—IX.

Water—I, 278 ; **IV.**

Water is one of the most valuable and useful substances to the photographer, yet this fact is not always appreciated. The greatest of care should be taken in seeing that the water is perfectly pure. Foreign substances in the water used for mixing chemical solutions are responsible for a large majority of failures or difficulties met with. Pure water is a colorless liquid entirely devoid of taste and smell, and possesses a neutral refraction. Pure water, such as mountain lakes and rivers which flow over crystalline rocks, is called *soft* water. Water containing more than eight or ten grains of mineral matter to the gallon is called *hard* water. *Soft* water usually contains more or less organic matter and sometimes a slight quantity of salts of potash, soda, lime and magnesia. *Hard* water generally contains a large quantity of carbonate of lime, as well as many other impurities. In mixing up the various solutions it is preferable to use distilled water, but such is not always easily obtainable; therefore filtered rain water will answer, or even melted snow. It is advisable for every photographer to thoroughly test the water he is using, and thus avoid, so far as possible, any danger of waste material. The tests which follow will prove of special value.

Water Color.

Water color is color pigment dissolved in water and used for the coloring or tinting of photographs, lantern-slides, etc., as well as for painting what is known as water-color pictures.

Water Distilled.

The purest form of water is obtained by converting water into a gas and then condensing it again to water. By this process all of the mineral and solid impurities are left behind. Distilled water should be used for mixing all photographic solutions, for it is only by its use that one can be absolutely certain of the most perfect results.

Water, Hard.

(*See* **Water.**)

Water, Soft.

(*See* **Water.**)

Water Tests—IV.

Alkalies.—If red litmus paper is immersed in the water and allowed to remain one-half hour and it does not change color, alkalies are not present.

Carbonic Acid.—Add an equal part of lime water to the water being tested. If carbonic acid is present a precipitate will result, and upon the addition of hydrochloric acid the precipitate will effervesce.

Chlorides.—If a solution of silver nitrate gives a precipitate in water chlorides are present.

Hard Water.—Dissolve good soap in alcohol; drop a few drops in a glass of water. If the water becomes milky it is *hard,* while if it remains clear it is *soft.*

Iron.—Boil nut galls and add to the water. If iron is present the water will turn to a gray color. Add a pinch of red prussiate of potash; if it turns blue, iron is present.

Lime.—Place two drops of strong oxalic acid solution in a glass of water. If it turns the water milky, lime is present. When lime is present ammonium oxalate will give a precipitate.

General Purities.—In half a tumbler of water place a couple drops of dilute sulphuric acid and enough permanganate of potash to tinge it to a faint rose color. Cover the glass with a saucer or glass plate. If after 15 or 20 minutes the pink tinge still remains visible, the water is all right for general photographic use, yet distilled water should be used, if possible, in mixing all solutions.

Organic Matter.—Organic matter is present when permanganate does not give a permanent pink tint to the water.

Sewage Gases.—Into a wide-mouthed bottle pour about one-half pint of water. Close it with a stopper or the palm of the hand, and shake violently up and down. Should an offensive odor be then detected, the water is contaminated with sewage gas.

Sodium Chloride.—With distilled water make a solution of silver nitrate. Carefully clean a glass and put a little of the solution in it, being sure that the solution remains transparent. Pour in some of the water to be tested. If a strong milkiness appears which is not cleared by the addition of a

little diluted nitric acid, the water contains much sodium chloride.

Sulphuric Acid.—If the addition of barium chloride gives a precipitate, sulphuric acid is present.

Waterhouse Stops—I, 58; **VI.**

(*See* **Diaphragms, Waterhouse.**)

Water-Tone Paper—I.

Wax, Paraffin.

(*See* **Paraffin.**)

Wax, Sealing.

(*See* **Sealing Wax.**)

Weight, Apothecaries—II, Page 362.

The weight by which formulæ are usually, and most conveniently, made up.

Weight, Atomic—II, Pages 348–355.

Atomic weight is the relative weight of an atom of an element compared with that of hydrogen, which, being the lightest, is taken as the unit.

Weight, Avoirdupois—II, Page 362.

The weight by which chemicals are usually sold.

Weight, Troy—II, Page 362.

The weight usually employed for weighing precious metals.

Weights and Measures—II.

Weights, Coins as.

(*See* **Coins as Weights.**)

Welsbach Gas Lamp—IX.

Wet Collodion Process—I, Page 36; **II.**

An early photographic process. On account of its strong image and fineness of grain it is still largely employed for making half-tone plates; also for copying, etc. The iodized collodion plate is sensitized in a silver nitrate bath and exposed while wet. The plate is developed in pyro, or an iron developer, and fixed in potassium cyanide.

Wet Plate Process—II.

A process in which the plate is immersed in a sensitizing solution immediately before use (exposed while wet).

White Drapery Development—II.

White Ink—V, 999.

(*See* **Ink, White.**)

Whole Plate.
A plate 6½ x 8½ inches in size.

Wide-Angle Lens.
(*See* **Lens, Wide-Angle.**)

Wild Flowers, Photographing—III.

Wollensak Shutters—VI.

Wood, Leather, etc., Blacking for—VI.
(*See* **Varnish.**)

Wood Naphtha.
(*See* **Alcohol, Methylic.**)

Wood Spirit.
(*See* **Alcohol.**)

Worked-in Background.
(*See* **Background, Worked-in.**)

X

X-Ray Photography—II.
Röntgen Rays.
The art of securing an image on a photographic plate of opaque bodies in various degrees, according to their density and relative thickness. The ray itself is invisible. Platinum, lead and silver will not allow the rays to pass through, and for this reason a lead plate is employed to protect the sensitive photographic plate from the X-rays. Aluminum, wood, paper, etc., do not obstruct the X-rays, neither are the rays refracted by prisms of carbon disulphide, while prisms made of vulcanized rubber, as well as those made of aluminum, give an uncertain refraction. The X-rays were discovered by Professor Rontgen, and were called X-rays on account of the difficulty experienced in classifying them. X-rays are produced by passing an electric current through a large vacuum tube, known as Crooke's tube. One of the greatest advantages of the X-rays is that it allows the physician to secure photographs through the tissues of the body, showing fractures of bones, or the presence of bullets and other foreign substances.

X-Ray Plates—II.

Y

Yellow Screen.
(*See* **Color Filters.**)

Z

Zinc—Zn.

A metal of bluish-white color, having crystalline fractures. *Soluble* in acids. *Use.* Iron coated with thin layers of zinc (galvanized iron) is used for washing tanks, etc., as it does not rust. Zinc tanks and trays are also used to a considerable degree for this same reason. Sheets of zinc are employed in the half-tone process, for making line cuts, etc. The salts of zinc, however, are used but little in photography.

Zinc Chloride—$ZnCl_2$.

White, granular, deliquescent powder. *Soluble* in about 0.5 parts water, 1 part alcohol, and ether at 60° Fahr. *Used* principally as an antiseptic.

Zinc Oxide—ZnO.

Zinc White or Chinese White.

White powder. Absorbs carbon dioxide from air. *Soluble* in dilute acids, ammonia, ammonium carbonate; insoluble in water. Keep in air-tight vessel. *Used* in making paint.

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